"Step after step the ladder is ascended."—George Herbert, *Jacula Prudentum*.
"Agriculture is the most healthful, most useful, and most noble employment of man."—Washington.

THE

TROPICAL AGRICULTURIST:

(ESTABLISHED 1881.)

A MONTHLY RECORD OF INFORMATION FOR PLANTERS

OF

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BRITISH MUSEUM

EDITED BY

J. FERGUSON,

of the "Ceylon Observer," "Ceylon Handbook and Directory," *&c.*

"It is both the duty and interest of every owner and cultivator of the soil to study the best means of rendering that soil subservient to his own and the general wants of the community; and he, who introduces, beneficially, a new and useful *Seed, Plant or Shrub* into his district, is a blessing and an honour to his country."—Sir J. Sinclair.

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1900.

TO OUR READERS.

In closing the Nineteenth Volume of the "**Tropical Agriculturist,**" we would as usual direct attention to the large amount of useful information afforded and to the great variety of topics treated in the several numbers. From month to month, we have endeavoured to embody in these pages the latest results of practical experience and scientific teaching in all that concerns tropical agriculture ; and our ambition has been to make this periodical not only indispensable to the planter, but of service to business men and capitalists, never forgetting that agriculture trenches upon every department of human knowledge, besides being the basis of personal and communal wealth.

While directing our attention chiefly to the products prominently mentioned on our title-page, we have always taken care to notice minor industries likely to fit in with sub-tropical conditions ; and our readers have an ample guarantee in the index pages before them, that, in the future, no pains will be spared to bring together all available information both from the West and East, the same being examined in the light of the teachings of common sense as well as of prolonged tropical experience in this, the leading Crown and Planting Colony of the British Empire.

Special attention has, during the past year, been given to the introduction and extension of an industry in rubber-yielding trees (more especially in the planting of Para and Castilloa trees), and much literature on the subject will be found throughout our ages ; also on cacao in Central America and the West Indies as well as in Ceylon ; coffee nd allied products in Brazil, Mexico, Costa Rica, East Java, Nyassaland, British Central Africa ; Liberian coffee in Sumatra, Java, the Straits Settlements ; and to other new developments in coconuts and tobacco planting, &c., in the Malayan Peninsula, Sumatra and North Borneo, as well as in this Island.

The Tea-planting Industry has sprung into so much importance in India (South as well as North) and Ceylon, as also in Java, that a considerable amount of space is naturally given to this great staple ; and we think it will be admitted by impartial judges that the *Tropical Agriculturist* should be filed, for the convenience of planters, in every Tea Factory in this Island, in India and in Java.

A full and accurate Index affords the means of ready reference to every subject reated in this, the Nineteenth volume, which we now place in our subscribers' hands, in the ull confidence that it will be received with an amount of approval, at least equal to that which has been so kindly extended to its predecessors.

To show how fully other Products besides Tea are treated in this volume, we may mention the number of entries under several headings as follows :—Coffee (including Liberian) 42 ; Cacao 24 ; Indiarubber 55 ; Coconuts and other Palms 18 ; and Miscellaneous Products nearly 1,000. In the 19 Volumes, the references to Rubber, Cacao and Coffee number many thousands, as also to Coconuts and other Palms.

We are convinced that no more suitable or useful addition can be made to a Planting Company's Library or gift to a tropical planter or agriculturist, whether he be about to enter on his career, or with many years of experience behind him, than the nineteen volumes of our periodical which we have now made available. They are full of information bearing on every department and relating to nearly every product within the scope of sub-tropical industries.

In conclusion, we have to tender our thanks to readers and contributors, and our wish that all friends may continue to write instructively and to read with approval ; for then, indeed, must the "**Tropical Agriculturist**" continue to do well.

J. FERGUSON.

COLOMBO, CEYLON ; 5TH JULY, 1900

☛ All Planters of New Products or Pioneers in new lands should not fail to order this periodical as their best instructor.—Every Tea Factory, Coffee or Cacao Store ought to have a file of the TROPICAL AGRICULTURIST, which contains a vast amount of information about Tea, and a Record of the Tea and other Produce Sales.

The Portraits and Biographies of several OLD COLONISTS AND PLANTING PIONEERS are likely to appear in the next Volume.

ORDER FOR THE

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Yours faithfully,

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To Messrs. A. M. & J. FERGUSON,

"CEYLON OBSERVER" OFFICE,

COLOMBO, CEYLON.

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as reminded that with the June Number, already received by them, and the Index and Title-page now issued, the NINETEENTH VOLUME (1899-1900) is closed.

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WHAT IS THOUGHT OF

THE "TROPICAL AGRICULTURIST."

A gentleman resident in the Central Province, who has as good opportunities of knowing what is of benefit to Planters as anyone we know, sent us the following explioit testimony to the value of the "*T.A.*":—

"Since its commencement, I have regularly seen and perused the *Tropical Agriculturist.* There can be but one opinion that its scope and object are highly important, and that it supplies a distinct desideratum, which it is to the interest of every estate proprietor, to have available in the bungalow for the use of his *locum tenens*, or superintendent. As a magazine it provides varied and instructive fresh literature at intervals; deprived, as most in Ceylon are, of easy access to libraries ; and as years go by it will growingly become 'The Ceylon Encyclopædia' with reference to agricultural operations. Viewing estate property as practically a permanent investment to any proprietor, the trifling charge of R12 per annum—a rupee a month—is certainly of no account, provided the separate numbers are kept, and bound together yearly as a book of reference for the benefit of the manager and his successors. In that light, as the property of an estate to be handed over just as much as its office furniture, few proprietors would probably refuse to authorise its being taken and filed regularly (if the periodical was brought under their notice), more especially as on looking over the most recent volume one cannot fail to see how much valuable information on 'Tea' has been collated. In the belief that 'Tea' has restored prosperity to Ceylon, and that plantation property is a good investment for capitalists, such should not omit the office and connected equipment so advisable on all 'pucka' estates, a part of which should be the *Tropical Agriculturist.* I find I have gone on writing, but, as I am getting the numbers for the past year ready to be bound, the volume is before me."

THE VALUE OF THE "*T.A.*" TO CEYLON ESTATE OWNERS.—A planting correspondent wrote some time ago:—"I think proprietors should supply every tea estate with the *T.A.* The information in it with regard to everything in connection with tea &c. is invaluable : it would pay its value over and over again. Owners of estates should not leave it to hard-up superintendents to take it in."

A Correspondent writes:—"I venture to say the volumes of the *Tropical Agriculturist* will be at a premium a few years hence: it is a book which is bound to rise in value as time rolls on, and subscribers will probably, if they so choose, be able to sell at a handsome profit, besides having had the benefit of using the information in the meantime."

From a Proprietor:—"I wonder how many planters know what they lose in not subscribing to your wonderful publication ? The cost is absolutely nothng, compared to the convenience of having in a bound book all that is interesting and necessary in the literature of their calling. Information culled from a thousand sources, price lists of all produce sold locally, and home advertisements not seen elsewhere and a hundred other things necessary for them to see and to know. The *T.A.* is, in fact, a convenient file of useful information daily arising and permanently preserved."

Sir W. T. Thistleton Dyer, F.R.S., F.L.S., C.M.G., of Kew Gardens:—"Sir Joseph Hooker and myself always look out for the successive numbers of the *T.A.* with eagerness, and I keep a file in my office for reference. It is impossible to speak too highly of the utility of such a publication and of the way it is managed."

Sir George King, late of the Calcutta Government Museum:—"I know your *Tropical Agriculturist* well, having carefully secured every number since the beginning. You have succeeded in making it a wonderfully useful magazine of information for planters."

Surgeon-Major Bidie, F.L.S., of the Government Central Museum, Madras:—I find the *Tropical Agriculturist* a most interesting and useful publication. It finds a place on the table of our Public Library and is much prized."

The TROPICAL AGRICULTURIST MONTHLY.

Vol. XVIII. COLOMBO, JULY 1st, 1899. No. 1.

TESTING CEYLON TIMBERS.

CEYLON timber logs have frequently been tested both practically and scientifically. Mr. Henry Byrne, when chief assistant to Major Skinner, we remember, published a series of tables with tests of a great variety of local timber trees in logs, scantlings, &c. But we suppose the most elaborate series of scientific tests is that which reaches us in the "Imperial Institute Journal" for May, being a report on the results of mechanical tests applied to a series of logs of timber received from the Ceylon Government (by Professor W. C. Unwin, F.R.S., Referee to the Scientific and Technical Department of the Imperial Institute. We read:—"The whole of the samples (22 in number) were in a dry and well-seasoned condition, but some of them had serious drying cracks or shakes. No. 8 sample (Mandora), and No. 20 (Halmilla) have a good elastic range. No. 13 is an exceptionally light timber and—as would be expected—of relatively low strength. On the other hand, No. 22 (Nedun) is a very heavy timber of relatively great strength. No. 16 (Chomunti) is rather heavier than No. 22, but its strength is not so great. No. 14 (Walukina) is a rather light timber of good strength. The following tabular statements give:—(1) The heaviness of the timbers; (2) Their resistance to shearing along the fibres; (3) The crushing strength; (4) The transverse strength; (5) The deflections observed in the bending tests; and (6) The co-efficient of elasticity from the bending tests." We give the tables below:—

REPORT ON THE RESULTS OF MECHANICAL TESTS APPLIED TO A SERIES OF LOGS OF TIMBER RECEIVED FROM THE CEYLON GOVERNMENT.

(By Professor W. C. Unwin, F.R.S., Referee to the Scientific and Technical Department of the Imperial Institute.)

TABLE I.—HEAVINESS.

No. of Specimen.	Name of Timber.	Locality.	Weight of Timber in pounds per cubic foot.	
1 (c)	Sapu ...	Ceylon	41·75	mean
	do ...	do	41·07	41·41
2 (c)	Panah Ka ...	do	55·06	54·86
	do ...	do	54 66	
3 (c)	Gurukina ...	do	63·02	62·62
	do ...	do	62·23	
4 (c)	Vuinauku ...	do	40·58	40·41
	do ...	do	40·24	
5 (c)	Satinwood ...	do	64·66	64·32
	do ...	do	63·98	
6 (c)	Milla ...	do	60·81	60·92
	do ...	do	61·03	
7	Hauthai ...	do		48·87
8	Mandora ...	do		59·70
9	Ubberiya ...	do		56·71
10	Jawenna ...	do		46·11
11	Dawata ...	do		47·33
12	Margosa ...	do		47·32
13	Lunumidella...	do		20·39
14	Walukina ...	do		32·41
15	Ranai ...	do		63·31
16	Chomunti ...	do		75·46
17	Suriya ...	do		50·33
18	Jak ...	do		43·37
19	Del ...	do		48·09
20	Halmilla ...	do		49·93
21	Suriya Mara...	do		57·01
22	Nedun ...	do		70·79

TABLE II.—RESISTANCE TO SHEARING ALONG THE FIBRES.

No. of Specimen.	Name.	Locality.	Area shared. Sq. in.	Shearing Pounds per sq. in.	Stress. Tons. per sq. in.
1 (f)	Sapu	Ceylon	4·010	753	0·3359
2 (f)	Panah Ka ...	do	3·960	745	0·3325
3 (f)	Gurukina ...	do	3·999	948	0·4231
4 (f)	Vuinauku ...	do	3·960	486	0·2170
5 (g)	Satinwood ...	do	3·999	1,903	0·8496
6 (g)	Milla	do	4·100	1,147	0·5116
6 (f)	do	do	4·240	880	0·3936
6 (h)	do	do	4·000	984	0·4392
7	Hauthai (1) ...	do	4·120	1,013·4	0·452
8	Mandora (2) ...	do	3·984	620·4	0·277
19	Ubberiya (1) ...	do	4·041	1,066·6	0·476
10	Jawenna (3) ...	do	4·036	1,083·7	0·484
11	Dawata (5) ...	do	3·880	1,075	0·480
12	Margosa (4) ...	do	3·835	1,326·0	0·592
13	Lunumidella (6)	do	3·901	478	0·213
14	Walukina (1) ...	do	4·096	336·9	0·150
15	Ranai (5) ...	do	3·821	925	0·413
16	Chomunti (5) ..	do	3·940	1,333	0·595
17	Suriya (1) ...	do	3·862	926 9	0·414
18	Jak (5) ...	do	3·881	672	0·300
29	Del (7) ...	do	3 744	1,236	0·551
20	Halmilla ...	do	4·028	830·3	0·371
21	Suriya Mara (7)	do	3·880	1,283	0·572
22	Nedun (5) ...	do	3·920	1,486	0·663

(1) Nearly plane fracture. (2) Rather ragged fracture. (3) Irregular fracture small knot. (4) Irregular fracture. (5) Fairly plane fracture. (6) Broke partly by tension. (7) Very irregular fracture.

TABLE III.—CRUSHING STRENGTH.

No. of Specimen.	Name.	Locality.	Dimensions in inches. Section.	Height.	Area of crushed section. sq. in.	Crushing Stress. Tons per sq. in.
1						
2 (c)	Sapu ...	.. Ceylon	3·049 by 3·057	8·130	9·320	1·570 (5)
3 (c)	Panah Ka ...	... do	3·175 by 3·159	8·075	10·020	2·768
4 (c)	Gurukina ..	.. do	3·061 by 3·034	8·085	9·285	2·408 (5)
4 (c)	Vuinanku ..	.. do	2·892 by 2·874	7·984	8·312	1·932
4 (d)	Do ..	.. do	2·891 by 2·892	8·057	8·360	1·942
5 (e)	Do ..	.. do	2·917 by 2·876	7·967	8·389	1·927
6 (c)	Satinwood ..	.. do	3·151 by 3·166	8·008	9·974	3·374
7 (c)	Milla ..	.. do	2·890 by 2 925	8·007	8·453	3·118
8	Hauthai (2) ..	.. do	3·100 by 2·672	8·146	8·283	2·778
9	Mandora (1) ..	.. do	3·194 by 3·068	8·139	9·799	2·619
1	Ubberiya (1) ..	.. do	3·033 by 3·026	8·140	9·178	3·433
10	Jawenna (3) ..	.. do	3·043 by 3·034	8·152	9·232	3·454
11	Dawata (1) ..	.. do	2·879 by 2·862	8·034	8·240	2·670
12	Margosa (1) ..	... do	3.086 by 2·497	8·171	7·706	2·9-7
13	Lunumidella (1)	... do	2·872 by 2·850	8·037	8·166	1·358
14	Walukina (4)	... do	2·910 by 2·819	8·026	8·203	2·743
15	Ranai (2) ...	... do	2·863 by 2·888	8·015	8·268	2·605
16	Chomunti (1)	.. do	2·913 by 2·867	7·974	8·351	2·938
17	Suriya (4) ...	... do	2·976 by 2·833	8·036	8·430	2·818
18	Jak (2) ...	... do	2·897 by 2·873	7·910	8·323	3·400
29	Del (1) ...	... do	2·896 by 2·869	7·925	8·308	2·932
20	Halmilla ...	... do	3·012 by 2·996	8·146	9·024	3·442
21	Suriya Mara (1)	... do	2·881 by 2·851	8·012	8·214	4·184
22	Nedun (1) ...	... do	2.884 by 2·851	7·933	8·222	3·919

(1) Gave way by shearing.
(2) Gave way by shearing and splitting.
(3) Split before testing. Gave way by shearing.
(4) Split along the grain.
(5) Knot in specimen.

TABLE IV.—TRANSVERSE STRENGTH.

No. of Specimen.	Name.	Locality.	Dimensions in inches. Breadth.	Depth.	Span Ins.	Centre Breaking Load. Pounds.	Co-efficient of Transverse Strength. Pounds per sq. in.	Tons per sq. in.
1 (a)	Sapu ..	.. Ceylon.	2·925	3·378	42	4,000	7,551	3·370
1 (b)	Do ..	.. do	2·924	3·387	42	4,300	8,078	3·606
						Means	7,815	3·488
2 (a)	Panah Ka	.. do	2·915	3·378	48	5,860	12,690	5·661
2 (b)	Do	.. do	2·919	3·383	48	6,140	13,230	5·907*
						Means	12,960	5·784
3 (a)	Gurukina	.. do	2·909	3·378	48	4,980	10,800	4·820
3 (b)	Do	.. do	2·920	3·385	48	3,100	6,673	2·979
						Means	8,737	3·900
4 (a)	Vuinauku	.. do	2·914	3·387	48	4,455	9,596	4·284
4 (b)	Do	.. do	2·853	3·369	48	4,240	9,432	4·210
						Means	9,514	4·247
5 (a)	Satinwood	.. do	2·914	3·381	48	5,840	12,630	5·635
5 (b)	Do	.. do	2·916	3·375	48	6,890	14,930	6·665
						Means	13,780	6·150
6 (a)	Milla ..	.. do	2·912	3·376	48	6,780	14,710	6·564
6 (b)	Do ..	.. do	2·919	3·363	48	6,790	14,810	6·612
						Means	14,760	6·588
7	Hauthai	.. do	2·873	3·274	40	4,000	7,793	3·479
8	Mandora	.. do	2 859	3·287	40	7,060	13,710	6·125
9	Ubberiya	.. do	2·886	3·299	40	5,285	10,090	4·505
10	Jawenna	.. do	2·868	3·282	40	4,154	8,068	3·6(2
11	Dawata (1)	.. do	2·875	3·275	40	5,560	10,815	4·83
12	Margosa	.. do	2·865	3·286	40	5,921	11,480	5·125
13	Lunumidella (1)	.. do	2·842	3·266	40	2,890	5,720	2·55
14	Walukina	.. do	2·814	3·259	40	4,490	9,014	4·024
15	Ranai (1)	.. do	2·868	3·273	40	5,410	10,565	4·71
16	Chomunti (1)	.. do	2·861	3·231	40	7,210	14,485	6·46
17	Suriya ..	.. do	2·859	3·262	40	5,913	11,660	5·206
18	Jak (2) ..	.. do	2·872	3·270	40	3,500	6,839	3·053
19	Del (1) ..	.. do	2·871	3·284	40	4,806	9,307	4·155
20	Halmilla (1)	.. do	2·844	3·090	40	6,995	15,450	6·898
21	Suriya Mara	.. do	2·869	3·238	40	7,322	14,600	6·518
22	Nedun (1)	.. do	2·850	3·059	40	7,130	16,040	7·161

* Broken by shearing and tenison.
(1) Broken by tearing on tension side.
(2) Split diagonally along the grain.

Table V.— DEFECTIONS OBSERVED IN THE BENDING TESTS,

No.	Deflection.		Centre Load, Pounds.													
		0	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
			Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
1 (*a*)	Increment of ...	0	0·078	0·078	0·074	0·072	0·064	0·084	0·028	—	—	—	—	—	—	—
	Total	0	0 078	0·156	0·230	0·302	0·366	0·450	0·478	—	—	—	—	—	—	—
1 (*b*)	Increment of ...	0	0·096	0·078	0·034	0·122	0·010	0·082	0·086	0·176	—	—	—	—	—	—
	Total	0	0·096	0·174	0·208	0·330	0·340	0·422	0·508	0·684	—	—	—	—	—	—
2 (*a*)	Increment of ...	0	0·092	0·086	0 074	0·080	0·082	0·068	0·086	0·100	0·290	—	—	—	—	—
	Total	0	0·092	0·178	0·252	0 332	0·414	0·482	0·568	0·668	0·958	—	—	—	—	—
2 (*b*)	Increment of ...	0	0·119	0 089	0·060	0·132	0·070	0·074	0·056	0·124	0·140	0·276	0·268	0·332	—	—
	Total	0	0·119	0·208	0·268	0·400	0·470	0·544	0·600	0·724	0·864	1·140	1·408	1·740	—	—
3 (*a*)	Increment of ...	0	0·100	0·080	0·068	0·092	0·060	0·100	0·116	0·132	—	—	—	—	—	—
	Total	0	0·100	0·180	0·248	0·340	0·400	0·500	0·616	0·748	—	—	—	—	—	—
3 (*b*)	Increment of ...	0	0·111	0·080	0·080	0·076	0·112	—	—	—	—	—	—	—	—	—
	Total	0	0·111	0·191	0·271	0·347	0·459	—	—	—	—	—	—	—	—	—
4 (*a*)	Increment of ...	0	0·140	0·108	0·098	0·148	0·142	0·200	0·188	0·734	—	—	—	—	—	—
	Total	0	0·140	0·248	0·346	0.494	0 636	0.836	1·024	1·758	—	—	—	—	—	—
4 (*b*)	Increme t of ...	0	0·140	0·132	0·116	0·130	0·138	0·164	0·680	—	—	—	—	—	—	—
	Total	0	0·140	0·272	0·388	0·518	0·656	0·820	1·500	—	—	—	—	—	—	—
5 (*a*)	Increment of ...	0	0·100	0·070	0·086	0·084	0·074	0·094	0·100	0·082	0·138	0·146	0·214	—	—	—
	Total	0	0·100	0·170	0·256	0·340	0·414	0·508	0·608	0·690	0·828	0·974	1·188	—	—	—
5 (*b*)	Increment of ...	0	0·086	0·074	0·040	0·140	0·066	0·060	0·072	0·072	0·076	0·100	0·114	0·080	0·180	—
	Total	0	0·086	0·160	0·200	0·304	0·370	0·430	0·502	0 574	0·650	0·750	0·864	0·944	1·124	—
6 (*a*)	Increment of ...	0	0·096	0·092	0·078	0·080	0·076	0·082	0·040	0·142	0·062	0·152	0·092	0·150	—	—
	Total	0	0·096	0·188	0·266	0·346	0·422	0·504	0·544	0·686	0·748	0·900	0·992	1·142	—	—
6 (*b*)	Increment of ..	0	0·084	0·082	0·082	0·080	0·060	0·080	0·070	0·068	0·094	0·102	0·104	0·200	0·234	—
	Total	0	0·084	0·166	0·248	0·328	0:388	0·468	0·538	0·606	0·700	0·802	0·906	1·106	1·340	—
7	Increment of ...	0	0·100	0·060	0·092	0·068	0·112	0·068	0·120	—	—	—	—	—	—	—
	Total	0	0·100	0·160	0·252	0·320	0·432	0·500	0·620	—	—	—	—	—	—	—
8	Increment of ...	0	0·058	0·027	0·033	0·032	0·026	0·056	0·026	0·037	0·052	0·053	0·048	0·057	0·099	0·376
	Total	0	0·058	0·085	0·118	0·150	0·176	0·232	0·258	0·295	0·347	0·400	0·448	0·505	0·604	0·980
9	Increment of ..	0	0·055	0·043	0·042	0·042	0·055	0·049	0·060	0·049	0·073	0·072	—	—	—	—
	Total	0	0·055	0·098	0·140	0·182	0·237	0·286	0·346	0·395	0·468	0·550	—	—	—	—
10	Increment of ...	0	0·052	0·048	0·036	0·039	0·055	0·038	0·070	0·064	—	—	—	—	—	—
	Total	0	0·052	0·100	0·136	0·175	0·230	0·268	0·338	0·402	—	—	—	—	—	—
11	Increment of ...	0	0·072	0 058	0·080	0·035	0·073	0·082	0·050	0·132	0·121	0·207	0·505	—	—	—
	Total	0	0·072	0·120	0·200	0·235	0·308	0·390	0·440	0 572	0·693	0·900	1·405	—	—	—
12	Increment of ...	0	0·072	0·060	0·063	0·065	0·070	0·063	0·091	0·084	0·112	0·090	0·262	—	—	—
	Total	0	0·072	0·132	0·195	0·260	0·330	0·393	0·481	0·568	0·680	0·770	1·032	—	—	—
13	Increment of ...	0	0·110	0 090	0·128	0·153	0·293	—	—	—	—	—	—	—	—	—
	Total	0	0·110	0·200	0·328	0·481	0·774	—	—	—	—	—	—	—	—	—
14	Increment of ...	0	0·043	0·057	0·045	0·053	0·052	0·070	0·050	0·075	—	—	—	—	—	—
	Total	0	0·043	0·100	0·145	0·198	0·250	0·320	0·370	0·445	—	—	—	—	—	—
15	Increment of ...	0	0·086	0·074	0·088	0·082	0·058	0·072	0·082	0·108	0·150	0·158	—	—	—	—
	Total	0	0·086	0·160	0·248	0·330	0·388	0·460	0·542	0·650	0·800	0·958	—	—	—	—
16	Increment of ...	0	0·050	0·050	0·052	0·028	0·053	0·054	0·055	0·039	0·071	0·050	0·128	0·130	0·180	0·270
	Total	0	0·050	0·100	0·152	0·180	0·233	0·287	0·342	0·381	0·452	0·502	0·630	0·760	3·940	1·210
17	Increment of ...	0	0·096	0·052	0·082	0·082	0·065	0·073	0·115	0·071	0·122	0·192	0·234	—	—	—
	Total	0	0·096	0·148	0·230	0·312	0·377	0·450	0·565	0·636	0·758	0·950	1·184	—	—	—
18	Increment of ...	0	0·105	0 080	0·068	0·079	0·066	0·082	0·080	—	—	—	—	—	—	—
	Total	0	0·105	0·185	0·253	0·332	0·398	0·480	0·560	—	—	—	—	—	—	—
19	Increment of ...	0	0·075	0·050	0·032	0·067	0·040	0·061	0·040	0·063	0·072	—	—	—	—	—
	Total	0	0·075	0·125	0·157	0·224	0·264	0·325	0·365	0·428	0·500	—	—	—	—	—
20	Increment of ...	0	0·067	0·033	0·065	0·045	0·055	0·053	0·053	0·049	0·060	0·065	0·080	0·195	0·210	—
	Total	0	0·067	0·100	0·165	0·210	0·265	0·318	0·371	0·420	0·480	0·545	0·625	0·820	1·030	—
21	Increment of ...	0	0·045	0·045	0·060	0·040	0·055	0·035	0·042	0·058	0·035	0·061	0·044	0·070	0·058	0·107
	Total	0	0·045	0·090	0·150	0·190	0·245	0·280	0·322	0·380	0·415	0·476	0·520	0·590	0·648	0·755
22	Increment of ..	0	0·042	0·049	0·038	0·039	0·048	0·041	0·053	0·046	0·040	0·054	0·072	0·058	0·090	0·205
	Total	0	0·042	0·091	0·129	0·168	0·216	0·257	0·310	0·356	0·396	0·450	0·522	0·580	0·670	0·875

TABLE VI.—CO-EFFICIENT OF ELASTICITY FROM BENDING TESTS.

No.	Name.	Locality.	Range of Stress. Pounds per square in.	Elastic deflection. per 100 pounds load in inches.	Co-efficient of Elasticity. Pounds per square in.	Co-efficient of Elasticity. Tons per square in.
1 (a)	Sapu	Ceylon	0 to 7,551	0·0146	1,126,000	502·3
1 (b)	,, ...	do	0 to 8,078	0·0145	1,125,000	502·0
2 (a)	Panah Ka ..	do	0 to 12,690	0·0162	1,519,000	678·1
2 (b)	,, ...	do	0 to 13,230	0·0171	1,431,000	638·6
3 (a)	Gurukina ..	do	0 to 10,800	0·0160	1,542,000	688·2
3 (b)	,, ...	do	0 to 6,673	0·0174	1,403,000	625 9
4 (a)	Vuinauku ..	do	0 to 9,596	0·0254	961,600	429 2
4 (b)	,, ...	do	0 to 9,432	0·0262	967,200	431·7
5 (a)	Satinwood ..	do	0 to 12,630	0·0173	1,419,000	633 6
5 (b)	,, ...	do	0 to 14,930	0·0144	1,712 000	764·3
6 (a)	Milla	do	0 to 14,710	0·0155	1,592,000	710·8
6 (b)	,, ...	do	0 to 14,810	0·0152	1,639,000	731·4
7	Hauthai.. ..	do	0 to 3,000	0·0166	955,900	426·7
8	Mandora ..	do	0 to 6,000	0 0084	1,872,000	835·4
9	Ubberiya.. ..	do	0 to 4,000	0·0099	1,596,000	712·5
10	Jawenna ..	do	0 to 3,000	0·0089	1,783,000	796·0
11	Dawata	do	0 to 3,500	0·0126	1,257,000	561·3
12	Margosa.. ..	do	0 to 4,000	0·0142	1,109,000	495·0
13	Lunumidella ..	do	0 to 1,500	0·0218	739,000	330 1
14	Walukina ..	do	0 to 2,500	0·0100	1,646,000	734·7
15	Ranai	do	0 to 3,500	0·0155	1,028,000	459·0
16	Chomunti ..	do	0 to 5,000	0·0100	1,651,000	737·2
17	Suriya	do	0 to 4,000	0 0159	1,014,000	452·6
18	Jak	do	0 to 3,000	0 0160	995,600	444·4
19	Del	do	0 to 4,500	0 0111	1,418,000	632·8
20	Halmilla ..	do	0 to 5,000	0·0109	1,749,000	780·7
21	Suriya Mara ..	do	0 to 5,500	0·0095	1,736,000	775·0
22	Nedun	do	0 to 5,000	0·0090	2,180,000	972 9

TIMBER SEASONING BY ELECTRICITY.

We extract the following from the *Engineer*:—

During the last few years considerable attention has been given to the invention of new processes for treating timber. The latest aspirant to fame is a process and apparatus which claims to give to timber properties which time alone has so far been able to produce. It is a French idea, and has, we are informed, met with considerable success in Paris, where works have been established to treat timber on a large scale. The Nodon-Bretonneau process involves the expulsion of the sap and its replacement by a solid matter, insoluble and aseptic. This is effected by placing the material to be treated in a vat containing a lukewarm solution made up of borax, 10 per cent.; resin 5 per cent; and ·75 per cent. of carbonate of soda. While in this bath, and electric current of about 100 volts pressure is caused to pass through the timber. The currents sets up what is termed lectro-capillary attraction, and drives out the p by the introduction of the solution. This treatment lasts from six to eight hours generally, after which the wood is subjected to a further treatment of a few hours' duration in a warm bath to allow of thorough permeation of the entire section. It is then removed and dried under cover by air currents, a process which is said to take from fourteen days to a couple of months, according to the density and thickness of the material. The inventors claim that not only is a considerable saving in time and expense in the drying of timber effected by this process, but that certain classes of wood, such as maritime pine, which have not hitherto been readiiy saleable owing to the large amount of moisture they contain, can by its use be readily deprived of the sap. The expenditure of electric current is said to be 600 watts per cubic metre per hour for five hours. The Electric Timber Seasoning Company, Victoria-street, Westminster, is introducing the system into this country, and a model apparatus has been fitted up at the work of Messrs. Johnson and Philips, Charlton Junction.

TEA PESTS AND BLIGHTS.

(BEING CHAPTER X. OF DR. GEO. WATTS' LARGE BOOK.*)

As a matter of convenience I have accepted the word "Pest" to denote Insect and other Animal Enemies, and the word "Blight" to refer to Fungal and other vegetable Parasites of the Tea Plant. While convenient the restrictions indicated for these words are of course open to criticism.

In the preceding chapters I have endeavoured to represent certain aspects of the cultivation of the plant that seem to me to call for more careful investigation, with a view to reforms. To my mind there exists sufficient presumptive evidence to justify the opinion that certain misapprehensions and defective methods of procedure have originated constitutional weaknesses that may be said to constantly predispose the plant to actual disease. In other words to render the depredations of its enemies and parasites more alarming than they might be otherwise. I have, therefore, advocated that such reforms as may be found desirable and practicable, should necessarily accompany more specific efforts to battle with the pests and blights.

In the foregoing remarks, at one or two places, I have already pointed out that the brief term of my explorations and the facilities of observation and investigation afforded, do not justify any attempt being made to deal with the pests and blights in a strictly scientific manner. It may be remarked that there are perhaps a dozen enemies of serious moment. The others, while occasionally doing considerable injury, are, nevertheless, of a local and accidental character. To solve the life histories of the dozen serious pests and blights, might take several years' patient study. To discover means of dealing with them would occupy much time and necessitate detailed and elaborate experiments.

SOURCES OF INFORMATION AND ASSISTANCE.

In presenting the observations which I now propose to offer, it may be as well to explain the chief sources of information and assistance which have been drawn upon in the study of the pests and blights of the tea plant:—

1st.—The Journals and Proceedings of the Agri-Horticultural Society of India, more especially from 1865 to 1885—the period of greatest interest by the Society in the subject of Tea Pests.

2nd.—Special publications on the India Tea Industry, including the annual Reports of the Indian Tea Association from 1882 to 1896.

3rd.—Newspaper correspondence from 1873 to present date, more especially the letters which appeared originally in the *Tea Gazette*, but which may now be conveniently consulted in the *T a Cyclopædia* and the *Tea Planter's Vade Mecum.* I have only incidentally referred to Ceylon newspapers for information, but the *Tropical Agriculturist* has been found of great value in confirming or correcting information regarding India.

4th.—*The Indian Museum Notes*, more especially Mr. E. C COTES' Account (*in Vol. III.*) of the *Insects and Mites which attack the Tea Plant in India.*

5th.—The invaluable aid of Mr. W. T. THISELTON DYER, Director of Kew Gardens, London, and of Mr. GEORGE MASSEE, Cryptogamic Botanist to the Herbarium of Kew, for two reports on certain fungal blights collected by me. Through the kindness of the Director General, Medical Department, I have been favoured with a proof copy of Dr. D. D. CUNNINGHAM'S forthcoming paper "On Certain Diseases of Fungal and Algal origin affecting Economic Plants in India;" in that paper three of the diseases of the tea plant have been dealt with and consequently drawn upon very largely by me.

The liberal assistance of Sir GEORGE KING and of Dr. D. PRAIN of the Botanical Gardens, Calcutta, for helping me with the determination of the plants collected during my tour in Assam. This every now and again has been of value in connection with the present report as, for example, in giving the names of the plants on which certain tea blights were found in the jungles.

The very great assistance, most generously afforded, by Mr. E. E. GREEN, the distinguished Entomologist of Ceylon, who has for many years identified himself with the study of the tea pests, and has in consequence discovered and investigated the life histories of a large number of very obscure species. Mr. GREEN has not only examined and reported on a complete series of the insect pests collected by me, but has in return presented a most valuable set of the pests collected by him in Ceylon. As types of the species he has named these have proved invaluable. Similarly I am much indebted to Dr. A. R. S. ANDERSON, Officiating Superintendent of the Indian Museum, for having examined the doubtful specimens referred by me to the Museum for determination, and to Mr. EDWARD BARLOW, the Assistant in charge of the Entomological Collections of the Indian Museum, for having very kindly worked with me during the time which I spent in comparing my specimens with the Museum sets.

6th.—But a debt of gratitude is more especially due to the large circle of planters whom it was my good fortune to meet during my tours, and from whom I obtained much valuable assistance. Added to all these sources of information I may mention the files of correspondence of the office of Reporter on Economic Products which have been freely drawn upon, and, lastly, the results of my own personal explorations.

The account to be given below, therefore of each species of pest or blight will be made, as far as possible, to embrace the entire available information. Stress will be laid on the effort to trace out the locality and date of first appearance, of each of the more important enemies of the tea plant, from the belief that particulars of that nature may very possibly be found of value in future investigations. I am fully conscious, however, that defects will be discovered, and can only hope that the present review of information may stimulate greater attention being given, more especially through the planters themselves once more, making the technical journals of the day the channels of recording their observations and opinions. The apathy that has existed, for the past score of years, in the matter of exchanging ideas, largely accounts, I am afraid, for the want of progess. Interest may be said to have been first prominently aroused in the subject of pests and blights by the late Mr. S. E. PEAL'S paper on "Mosquito," or, as he loved to called it, the "Tea Bug." Prior to the appearance of Mr. PEAL paper it had been vaguely designated "Blight," and was viewed as a mysterious visitation. Mr. PEAL'S showed that it was caused by an insect. Immediately there arose the enquiry as to methods of extermination. From that date one discovery after another followed quickly, until for twenty years or thereby the Journals of the *Agri-Horticultural Society* and the public newspapers of Calcutta teemed with letters and detailed reports on the pests and blights of the tea plant. Gradually, however, the subject seems to have lost interest, perhaps, through the discovery of new methods of cultivation and manufacture, that gave handsome returns in spite of the ravages of these enemies of the industry. Left thus to themselves they have multiplied and extended until attention has been forced once more to the question, which twenty years ago was discussed and pigeon-holed, by those most interested, *viz.*, the desirability of securing scientific assistance.*

In presenting this compilation of available information I may as well explain that I shall deal *first* with the Pests, and *next* with the Blights. Under Pests (Insects) I shall, as far as possible, follow the classification and the scientific determinations given in Mr. COTES' *Insects and Mites which attack the Tea*

* We republish this by request, because Dr. Watts' book is out of print.—ED. *T.A.*

* See Proposed Scheme, Journ. Agri-Horti. Soc. Ind., Vol. V, N. S. Proc., 24th Aug. 1876; 23rd Nov.; 21st Dec.; 19th April 1877; 23rd Aug.; Vol. VI. Proc., 18th Dec. 1879; Scheme Abandoned, 22nd July 1880.

Plant in India, It may, however, serve a useful purpose, if I attempt to indicate:—

(*a*) The insects described in the Indian Museum Notes (including Mr. COTES' special paper) as actually found on the tea plant in India. (The pests of this section will for the most part be found dealt with in Mr. COTES' *Insects and Mites, etc.*)

(*b*) The insects found on the tea plant in Ceylon, and which persumably may in the future be found in India.

(*c*) The insects discovered by me in addition to (*a*) and including also those which prior to the date of my explorations have been treated under the position (*b*) above.

These particulars will be brought out by the letters (*a*), (*b*) or (*c*) being placed alongside of the serial given to the species dealt with. My object in so doing is to exemplify once more the very remarkable fact that the pests and blights of the tea plant are rapidly becoming diffused over the world's areas of tea cultivation. A large percentage of these insects have never been seen by entomologists, except on the cultivated tea plant, though many are common enemies to both tea and coffee. It need hardly be repeated that these very striking circumstances point unmistakahly to cultivation having produced the conditions necessary for the appearance and distribution of these pests, the more so since the wild tea plant has been found to bear but a small percentage of these pests. (*Conf. with paras. 11 also 44 to 49*).

As a matter of convenience, I shall quote (at the end of the paragraph of references under each species) the resgistration numbers assigned to all pests collected by me and, when preserved in fluid, shall quote also the numbers engraved on the bottles or tubes in which they have been stored. These numbers, it will be understood, are given for Museum purposes only, and are of little interest to the general reader, except as indicating by their absence pest and blights of which specimens have not been procured and of which contributions would, therefore, be very acceptable.

COLEOPTERA.

THE BEETLES.

In this Order of insects both the grub and the perfect beetle may injure crops. The maggots or grubs are sometimes devoid of legs, hut more frequently have three pairs of jointed legs—one pair on each of the three segments of the body near the head, and a pair of sucker-feet near the anal extremity. The chrysalis looks like a deformed beetle, curled up and motionless. The perfect insect or beetle has an upper pair of hard wing-cases, called the *elytra*, and below these a pair of large membraneous wings that fold underneath the wing-cases.

There would seem to be five well-known species of beetles found on the tea, with perhaps three or four more that might be regarded as occasional enemies. The Cockchafer, or White Grub, in its larval stage eats the roots of the plant, and in its mature form would appear to devour the leaves as well. Then there are at least four species of leaf-feeders, that often do considerable damage to the crop when prevalent. Lastly, a wood-borer found in Ceylon, but not as yet in India. In Sibsagar district I came across a a longicorn grub which is perhaps a by no means an uncommon tea-borer, though, so far as I can discover, it has not as yet been described.

I. (*A.*) LACHNOSTERNA IMPRESSA, *Burm.*

THE COCKCHAFER OR WHITE GRUB.

REFERENCES.—*Tea Cyclopædia, 44*; *Notes on Tea in Darjeeling, 54*; *Tea Planter's Vande Mecum, p. 105*; *Bamber, Chem. and Agri. Tea, 242; Ind. Mus. Notes, Vol. I, 59*; *Vols. II., 149; III., 3, 122; Cotes, Ins. and Mites on Tea Plant in India, 5-7.* (*Reg. No. 21, tubes Nos. 261 and 233.*)

HISTORY.—The first mention of this beetle, as an enemy to the tea plant, so far as I have been able to discover, is contained in a letter by a Darjeeling Planter (1874) which will be found reprinted in the *Tea Cyclopædia*. The author of *Notes on Tea in Darjeeling* (1888), gives it the vernacular name of *Kumla*. Mr. BAMBER says, "it occurs in all the tea districts," but does not tell us whether he had actually found it in Assam. Moreover, he makes the somewhat puzzling remark, "with the aid of lamps collecting the grubs at night when out to feed, would probably prove a satisfactory method for lessening their numbers." So far as I am aware the grubs of this beetle never under any circumstance come above ground and have no occasion to do so since their food consists of the young roots of the plant. Mr. COTES remarks that it appeared in vast numbers in Darjeeling in 1891 (*vide* letter from Messrs. DAVENPORT & Co., October 1891, *Ind. Mus. Notes, III.) 3*). "Its prevalence in other years," Mr. COTES adds, "is shown by the fact that in 1883 no less than 2,695,000 individuals were collected and destroyed in the public gardens, Darjeeling (*vide Ind. Mus. Notes, Vol. I., 59*). But Mr. COTES makes no mention of its being found in Assam. It was collected hy me in a few gardens of the Sibsagar District, more especially at Khumtai and Ligri Pukri. Mr. CROLE (*Tea Text-Book, pp. 84 and 222*) incorrectly gives the scientific name of this beetle to the cricket.

DEPREDATIONS.—Like most of the predatory Melolonthin beetles this species lives in its larval stage on roots. The eggs are laid in the ground. From these the white grubs escape and very possibly attack the roots of weeds in the first instance. Ultimately they penetrate to the depth at which they are ahle to discover the roots of the tea plant and these they devour. Mr. COTES suggests that the eggs are likely to be laid about the beginning of the rainy season in Northern India. "How long is spent by the grubs in the ground before they become full grown we do not know, hut the fact that the European species *Melolontha vulgaris, Fabr.*, spends more than three years in this stage, while the American species, *Macrodactylus subspinosus, Fabr.*, spends the greater part of one year, leads to the supposition that an equally long period may be required in India." (*Cotes.*) A tea-planter, whose opinion will he found quoted below under the paragraph on "Remedy." thinks the Indian white grub may live in the ground for two or three years. At all events these grubs never come to the surface until after they have passed into the pupal stage, when in due course they emerge as the mature or copper-brown-coloured beetle.

At Khumati on the 7th of April I witnessed this insect making its escape from the ground and found several of the mature beetles apparently eating the leaves of the plant. A large assortment of grubs in all stages of growth were sent me in December 1895 from another garden in the Sibsagar District. These were turned up while heavy hoeing, and the manager very properly thought that they had better be picked out. He accordingly sent me a selection and desired to be informed if they were insects reported hitherto to injure the tea. These larvæ I submitted to the Entomological Department of the Indian Museum, as there seemed to me to he at least two, if not three species. The reply obtained was to the effect that "the larger grubs are the larvæ of a Melolonthin beetle probahly belonging to the genus *Lepidiota*, and the smaller are apparently the immature forms of *Lachnosterna impressa*. The mud ball sent is the pupal cell of a *Copris* beetle." Mud balls or nodules, of the size of a large hen's egg, are frequently thrown up from the ground, during the hoeing of tea gardens, when the soil consists of a fairly heavy clayey loam. They are commonly seen on the faces of road cuttings and may easily be mistaken for the mud cells of queen white-ants. On being broken open they will be found to contain a grub of a brown colour that may sometimes be 2 to 3 inches long. The nodules are stratified and closely compacted, the inner layer being sometimes of a darker colour than the outer layers.

APPEARANCE OF THE BUSH.—When beetles of this family attack tea, the plant at first is seen to

have lost its vigour. The buds often become *banjhi* and as the ravages of the beetle advance the leaves droop, turn brown and finally the bush appears as if killed, and it may actually be so. The appearance in fact is very similar to that when a wood-borer is at work (such as *Zeuzera coffeæ*), with this difference, that the whole bush appears to be suffering instead of one portion of it only, as is generally the case with borers. From what has already been said of this beetle, it will be understood there may be very little evidence of its ravages for months, while the grubs are steadily sapping the life of the plant and not one plant, for, as a rule, the beetle, if present, invades a considerable area, so that a whole plot of tea may be seen to be injured and clumps of bushes killed. When this occurs, the bushes if dug up will very often be found to have the roots invaded by fungi, and the inference is sometimes drawn, though incorrectly, that the fungus is the cause of the destruction. When bushes are seen to die in the manner indicated, it would be a good plan to have a healthy bush, near to those killed, dug up and carefully examined. It may then be seen that the fungus is only saprophytic, that is to say, a species that attacks dead, not living, plants, and that the real cause of the death of the bushes is the white grubs that may then be found feeding on the living roots.

REMEDY.—So far no cure has been discovered, except to dig up the grubs and kill them. But to check the multiplication of the pest it is necessary to catch and destroy the beetles. For this purpose children, armed with insect-collecting nets, would be found most valuable, when incited through the offer of a reward for the number captured. The planter whose letter first drew attention to this pest, tells us that he offered a reward to his coolies, when hoeing the land, of one pice for every 30 grubs collected. In consequence the coolies dug more than their day's task, so that the collection of the grub practically cost nothing. He informs us, however, that "to clear 15 acres cost in pice R108—giving two lakhs of grubs which filled two hogsheads. The eggs from which these grubs sprang must have been laid some two or three years before, and most likely they have quietly been doing great mischief. I am in the habit of buying the jungle—not all over the land, but in small holes, here and there, where convenient. This I found a great trap, for the grubs left the tea trees to attack this rotting vegetation and so were easily collected." The author of *Notes on Tea in Darjeeling* gives somewhat similar information, though he adds certain additional facts. The grub, he says, is "generally found in very rich soil, or where manure has been put down, or much jungle has been buried. This is fairly destructive to young cultivation and seed-beds, and eats off the roots of the young seedlings before they harden up, in some case killing off nearly every plant in young cultivation. Only remedy digging up. Plants attacked by *Kumlas* generally die slowly, first getting yellow at top and gradually dying down. Never fill in a vacancy thus caused without digging the insect up." Mr. COTES tells us that in Ceylon, on coffee estates "where Melolonthini larvæ at one time proved very troublesome, the only method of treatment that seemed to have been at all successful was digging out the grubs by hand." Speaking of the efforts made to extirpate an allied insect from the vines in Europe, bisulphide of carbon is said to have been used with success. Miss E. A. ORMEROD's *Text-Book of Agricultural Entomology*, pp. 80, 89-93, will be found to give many useful hints regarding Cockchafers. Mr. SAUNDERS ("*Insects Injurious to Fruits*") gives some valuable particulars regarding a species of *Lachnosterna* said to be injurious to the cherry, plum, and other such trees. During the day the beetle remains in repose, but at night becomes active, and, if numerous, rapidly defoliates the trees. They are best collected by placing a sheet below the bushes, during day time and then shaking when the beetles fall into the cloth, and may be collected in large numbers. He then adds that where the beetles are found abundantly the grubs may be expected to remain for some years to come since the larvæ eat the roots during a protracted period of existence. The presence of this beetle even if it does not eat the tea leaves is a very dangerous prognostication of future injury, and it should, accordingly, be collected and destroyed as much as possible.

2 (A) DIAPROMORPHA MELANOPUS, *Lacord.*

THE ORANGE BEETLE, sometimes called PEAL's BEETLE.

REFERENCES.—*Journ. Agri-Horti. Soc. Ind., Vol. II. n. s. Proc., Nov. 17, 1869, page ix; Vol. IV (n. s.) Proc., 19th Sept. 1872,* xl; *Feb. 27th, 1873. p.* vii; *April 24th, 1873, p.* xxii; *Vol. V., Proc., 27th Aug. 1874, p.* xlvi.; *Vol. VI. Proc., 24th July 1879, p.* xxii; *(Samples from Moran), identified by F. Moore, Proc., 25th Sept. 1879.* xxx; *S. E. Peal, in Tea Cyclopædia, pp. 35-36; Notes on Tea in Darjeeling, 52: Bamber, Chem. and Agri. Tea, p. 242; Indian Mus Notes, Vol. I., 106; II., 154; Cotes, Ins. and Mites on Tea Plant, p. 7; The Planter, June 20th, 1896; Crole, Text-Book, p. 222.*

(*Reg. No. 75, tube Nos. 62 and 272.*)

HISTORY.—It would appear that Mr. E. L. EDGAR, of Cossipore Tea Estate, Cachar, was the first to draw attention to this beetle. He then wrote, that it had only appeared this year (1869) in any numbers. We next hear of it in 1872 from Moran in Sibsagar District, Assam. Both samples were sent through the Secretary, Agri-Horticultural Society of India, to Mr. F. MOORE, who identified them as being *Dia promorpha melanopus*. Mr. PEAL sent samples of it to Mr. WOOD MASON along with such notes and coloured drawings that Mr. WOOD-MASON undertook to write for the Agri-Horticultural Society an account of the insect, which promises, apparently, he never fulfilled, as I have failed to trace a paper by him. Mr. PEAL himself, however, contributed some interesting particulars in the form of an article on Tea Pests that will be found in the *Tea Cyclopædia*. The subsequent historic facts are soon told. It was reported from Darjeeling by many writers, and Mr. COTES says, "The species is a common one in India."

DESCRIPTION.—A small orange-coloured beetle with the hard pitted wing-cases; head slightly darker coloured than the body; belly pale coloured. Size about ⅜th inch in length.

DEPREDATIONS.—This very troublesome little beetle is one of those examples of an insect having left its own natural food and taken to the tea. Its life history does not appear to have been traced out, but Mr. COTES says, "From what is known of other species of the same family, it may be expected that the eggs are laid upon the leaves, that the larvæ are active little creatures which feed upon the foliage, eventually transforming, in some sheltered corner, into stationary pupæ from which the beetles ultimately emerge. These points, however," he adds, "require corroboration."

Mr. W. J. FLEET sent me, from Salonah, Nowgong, samples of this beetle on the 27th June 1897, which he collected on the 17th April, but had observed the beetle subsequently up to date of his letter. The winged insect was collected by me at Nigiriting on the 1st of May, and in the Sibsagar District some weeks earlier. I had a large supply sent me from Sonada, Darjeeling, in June 1897. The first two letters announcing the discovery of this pest make no mention of the date of appearance of the beetle, but these letters were published,—the one on the 17th November 1869, the other on the 19th September 1872.

It is curious that no writer makes mention definitely of the date of appearance and disappearance of this pest. The above facts have been mentioned to show all that is known on these points. It may, therefore, be presumed that its period of depredation extends, say, from the beginning of April to about the end of August. One point there seems to be no doubt about. The insect does not lay its eggs on the tea, nor do the larvæ feed

on tea. It is only the mature beetle so far that has been seen on tea. I questioned the late Mr. S. E. PEAL on this point carefully, and he assured me that it certainly did not breed on tea, but, in his opinion, lived its early life on *ulu* grass (*Imperata arundinacea*).

Regarding the manner of its depredations there can be no doubt. Mr. EDGAR, its original discoverer, says, "These insects scrape the green stem below the Pekoe or Pekoe-Souchong leaf, sometimes below the souchong leaf if the flush is quick grown, and the stem soft. They scrape or eat a place on it from half an inch to one and a quarter inch in length and from just touching it to three-fourths through. According to the depth they go, so soon do the two or three leaves above tumble over and wither. Should they multiply, they will be very destructive to new flushes." The Assistant Manager of Moran Company, Assam, in his letter even goes more fully into the subject. He says "So serious is it that I estimate a loss of at least a maund of tea from this flush alone, which I am now plucking, and the loss on the entire year must be very serious." "The insect eats or gnaws only a small portion of the stem of the young shoot, which, whenever the sun touches it withers, droops, and in about a day falls off and then the shoot looks just as if it had been plucked; so that to discover the entire depredations of this little pest, the bushes have to be examined once or twice every day." Mr. S. E. PEAL's original account of this pest is also worthy of being quoted, since it throws some additional light on the methods of procedure adopted by this insect. "Naturally," he says, "it is a grass, eater, and may be found in considerable numbers where larger grasses abound in the open. It has a habit of alighting on the tips and flies rather slowly, resting under the curved-over tips of the *ulu* grass. These insects are at times found in threes or fours, and rest there in the little shade afforded. In attacking tea, they generally eat away portions of the green stem of the shoot that is just fit to pluck; the shoot falls over, withers, dies, and turns black and dry. If this beetle is at all common, considerable damage is done, and a garden or patch of tea presents a brown, withered appearance. As the portion eaten out of each stem is not large, a single beetle may ruin half a dozen shoots as one morning's work."

The author of *Notes on Tea in Darjeeling* says, "This is a small reddish yellow insect, which always runs up if cow-dung has been put down, and sometimes on new extensions, probably from the same cause. This beetle seems to attack heavy pruning or young tea more than pieces. It bites the shoot low down, and the shoot then withers and rots away. If there is sun-grass near the tea, the beetle goes to the grass, instead of the tea."

Mr. BAMBER did not evidently give much attention to this pest as he devotes only some two lines to it and says, "at present the damage done has been small." Mr. COTES (*Insects and Mites, etc.*) gives no particulars as to its depredations, but refers to the *Indian Museum Notes, Vol. I., p. 106*, where it is stated that specimens had been received from Mr. S. E. PEAL in 1885. A Darjeeling correspondent in *The Planter* says, "Often when reading articles on tea blights I have been surprised never to have seen the 'Orange beetle' mentioned." "I have often seen a dozen or more of these beetles on one bush, and every bud lying over dry and making the bush look almost as though withering up at first sight. Another peculiarity about them is, that they only seem to go for the Assam *jats*, and are scarcely ever seen on a China bush, evidently preferring the more succulent shoot of the Assam bush to the less juicy one of the China."

The fact of this insect showing a decided preference for the Assam tea is a point of considerable interest. This I had recorded in my diary and found, when in Assam, that Mr. PEAL and others had made the same observation.

REMEDY.—In consequence of our ignorance of the early history of this insect, only the one cure is open for consideration, namely, to collect and destroy the beetle. This Mr. F. MOORE recommended over 20 years ago, and nothing further has been brought to light. Mr. PEAL was of opinion that far from *ulu* grass being a protection (as suggested by the author of *Notes on Tea in Darjeeling*) it is the chief cause of the mischief. While walking through one of the Moran Company's gardens Mr. PEAL stripped the long blades of *ulu* grass through his hand and demonstrated to me thereby the day habit of the insect. But while Mr. PEAL speaks of the insect accomplishing its ravages in the morning, I found the insect in the Golaghat Sub-Division most active late in the afternoon. It is thus probable that it feeds both in the morning and in the afternoon.

A planter whose letter originally appeared in the *Tea Gazette*, says, "I have had thousands of bushes damaged by this insect, and find it pays 'hand over fist' to give coolies so much for catching the little pests, say a pice for fifty. By so doing I have succeeded in destroying as many as 20,000 in the day." Mr. PEAL says, "eight or ten well-made butterfly nets, depth, say 18 inches, and diameter of mouth 1 foot, ring or hook of stout brass wire, bent, soldered and inserted in 4 feet high bamboo handles. These in the hands of as many smart boys will bring down the numbers very rapidly. If at all plentiful, a boy can easily 'bag' 300 beetles per hour, and where not much of a pest, I have taken several times myself at the rate of 250 per hour. A few days of this and the nuisance will abate very perceptibly."

LADYBIRDS BEETLE MISTAKEN FOR THE ORANGE BEETLE.—I desire in passing to warn those, unfamiliar with the appearance of the Orange Beetle, not to be too hasty in coming to the conclusion that any small orange-coloured or red beetle, found on tea, is the pest here dealt with, or "at all events has no business" on the tea and had, therefore, better be removed. While visiting a garden in the Sibsagar District, the manager informed me that some ladybirds that I had caught and was examining were PEAL's Beetle. I assured him he was mistaken, and that the ladybird was one of the planter's best friends. It was no good my protesting that he was mistaken, for "some years ago they had caught that very insect by the thousands daily." Of course this was a case of mistaken identity. The insect to which he alluded, as having been collected, I found subsequently was the orange beetle right enough. The ladybird beetle is almost circular in outline and of a bright red colour with a few spots on its wing-cases. The orange beetle is a narrow elongated insect with a somewhat large and curiously truncated head, as if cut off abruptly. The wing-cases are of one uniform orange yellow colour throughout and seem as if some one had dabbed them all over with the point of a needle—the surface of the wing-case being pitted. The wing-cases of the ladybird are perfectly smooth and polished.

The larvæ and even the mature insect of the ladybird beetle are carnivorous and feed for the most part on the black aphis (*Ceylonia theæcola*), and I believe also on the larvæ of the mosquito and green-fly. I have watched them repeatedly devouring the black aphis, and been surprised that colonies of these curious aphides were not alarmed by the appearance among them of so formidable an enemy. They seem undisturbed and await their turn of destruction perfectly unconcerned.

The ladybird does not injure the tea in any way and should most certainly be encouraged, on no account destroyed, through the mistaken notion of its being the orange beetle.

3. (*A.*) ASTYCUS CHRYSOCHLORUS, *Wied.*

THE GREEN BEETLE.

REFERENCES.—*Indian Museum Notes, Vol. III., 99, 126; Cotes, Ins. and Mites, etc., 8.*

HISTORY.—I have given this insect the name for Green Beetle as a simple and characteristic description Mr. Cotes tells us that it "was sent to the Indian Museum in April 1892 from a tea garden in Cachar, where it was supposed to have been the cause of some injury to the bushes. It was said to strip the young leaves off the tea shoots."

REMEDY.—Nothing further can be said than has already been mentioned in connection with the orange beetle. The insect should be collected and destroyed whenever seen. As with all others so with this species, it may be said, that the sooner the pest is attacked the better. It is, however, unfortunate that we have to confess ignorance of the actual life history of this beetle.

4. (*C*) ASTYCUS LATERALIS, *Fabr*,

(*Reg. No. 102, tube No. 131.*)

HISTORY.—Messrs. BALMER LAWRIE & Co., on the 3rd of June 1897, were good enough to forward to me a few beetles that had been sent to them from the manager of the Hukanpukri Division of the Jokai Company's estates. Mr. E. RAMSDEN in forwarding the specimens reported that they had been found on one-year-old plants. They had come during the night in thousands and simply stripped the bushes. Fortunately they were easy to catch. My reply identified the insect as a species of *Astycus*. Subsequently, however, on re-examining the specimens, I came to the conclusion that it might possibly be a species already identified by entomologists. I accordingly sent the samples to Dr. ANDERSON, of the Indian Museum, and he was good enough to inform me that the name of the insect was as above (*A latesralis*). It is a much smaller beetle than *A chrysochlorus* is of a dark brownish black ground colour, with a distinctly green metallic tinge. The chief difference to the non-professional eye may be said to be that *A. Chrysochlorus* is about ⅞ of an inch in length and is of a bright pale green colour, while *A. lateralis* is about half an inch long and of a dull metallic green.

REMEDY.—There is nothing further to remark on this point than has already been said regarding *A. chrysochlorus*.

5. (*C*) ASTYCUS? *sp. nov*.

(*Reg. No. 101, tube No. 72.*)

HISTORY.—A black beetle with a metallic green tint, is not uncommon in Assam as a tea pest. At first I took this to be *A. chrysochlorus*, but, on comparing at the Museum my specimens with the beetle from Cachar, I agreed with Mr. BARLOW that it must be regarded as a distinct and possibly an undescribed species. In point of size it is intermediate between *A. lateralis* and *A. chrysochlorus*, but in colour is more like the former than the latter.

I was shown specimens at Amguri, by Mr. BUCKINGHAM, which he had collected some time prior to the date of my visit. The insect had not appeared very severe but was known all over the Sibsagar District. It came one year, gave considerable cause for anxiety, and then disappeared for a number of years, perhaps to re-appear when least expected.

DEPREDATIONS.—At Dirpai, North Lakhimpur, on the 8th July, I found a colony of this beetle doing much damage to some 10 to 12 bushes all near each other in one portion of the garden. The beetle commences on the margin of the leaf and eats downwards towards the midrib. When about half way down it commences on a new place, so that great ugly holes are cut out of the leaf.

REMEDY.—Same as for the other beetles dealt with under this genus.

6. (*B*) XYLEBORUS FORNICATUS, *Eichhoff*.

WOOD-BORING BEETLE.

REFERENCE.—*Indian Museum Notes, Vol. IV., p. 57 Plate V., Fig. 2.*

HISTORY.—This curious little beetle has been found in Ceylon to riddle the tea stems. Specimens were sent to the Indian Museum on the 20th January, 1897, by Mr. E. E. GREEN, and were forwarded to Mr. W. F. H. BLANDFORD, who identified the pest as the beetle above named.

DEPREDATIONS.—Mr. G. ALSTON, Superintendent of Craighead, Nawalapitiya, who first drew Mr. GREEN's attention to this new tea pest, wrote that it appears mostly in patches. "Most of the trees show no outward sign of the pest, except when almost every branch is attacked, when they turn rather yellow and stop flushing. Young trees about two years old, before they are topped, often snap off at the spot where the borers have made holes for their entrance or exit. Strong vigorous trees in good soil seem to be very little affected by it, and threw out good red wood even from badly bored stems. On the other hand. poor plants on ridges or poor soil seem to naturally feel the effect of it quickly, though in no case have I seen a tree *killed* by it. Isolated branches die off, but new branches come out in their place. As a rule, you can only tell an attack tree (except in the case of poung plants, when the stems snap off) on pruning it, when the holes in the wood are very apparent. It (the beetle) does not attack the cut surface after pruning, but makes its entrance through the back. In the case of young red wood it very generally goes straight down the pith; in older brances, I have often seen the wood riddled as if a charge of snipe-spot had been fired into it, with only one or two minute holes in the bark for exit or entrance. And yet in the case vigorous trees they seem to thrive notwithstanding. Since 1893 the pest has spread very much and become more general, though I cannot say that I see much difference in the fields that were attacked then." The plate quoted above is an excellent one but if the reader possess a copy of Miss ORMEROD's useful little *Text-Book of Agricultural Entomology* he will find (*p. 100*) an illustration of the very closely allied species *X. despar* which shows the ravages of the European species on the plum.

REMEDY.—It would be dangerous to suppose that because strong, healthy, well-nourished bushes seem little affected by this pest that there is no occasion to take steps to secure its eradication. Should it appear in the Indian tea areas, every effort should be at once made to stamp it out. Improve the vigour of the plant by manuring, deep drainage and other means. Lop off and burn all affected parts. If found in a small compact area I personally should, however, prefer to fire the plot. In my experience this is by far the most effectual remedy with all diseases that occur over fixed and limited areas, more especially if the diseaae is recognised and the firing can be accomplished early in Spring. All over the plot dry straw should be placed within and through the bushes so as to secure rapid combustion. The embers should be at once cleared away from the bark of the main stem. After the fire has burned out, the bushes should then be pruned and all charred portions removed. The Spring shoots may be delayed a few weeks, but in exceptional cases only will the bushes be killed, unless the firing be done late in the season.

LII.—Other Beetles Reported as attacking the Tea

7. CURCULIO TANYMECUS.

In the Journal Agri.-Horticultural Society of India *Vol. VI. n. s. Proc., 24th July 1879*, mention is made of a beetle sent to the Society by Messrs. WILLIAMSON, MAJOR & Co., "as doing much mischief to the tea bushes in the Munguldye Company's plantations." The specimens were forwarded to Mr. A. GROTE and ultimately submitted to Mr. F. MOORE. The reply appears in the Proc., of the 18th December, 1879. "The green beetle sent to you by the Munguldye Company is a *Curculio* allied, as *Moore* thinks, to *C. tanymecus*, but these beetles ordinarily bore into the stem and branches of plants and do not meddle with their leaves." I am unable to trace the name *C. tanymecus*. There is a genus of beetles known as *Tanymecus* but *Gemninger* and *Harold* make no mention under *Curculio* of a species *C. tanymecus*.

It is somewhat significant that the pest alluded to, in above correspondence, should apparently have disappeared while two species of *Astycus* (that are by no means remote from *Curculio*) should have taken its place as leaf-defoliators in Assam.

8. Two other as species of beetle have been sent to me by Mr. FLEET, injurious to tea, *viz.*, *Criocris impressa*

and *Odies bipunctata.* I have obtained no particulars regarding these beetles, and mention them purely in order to suggest further enquiry.

9 Grubs of *Lepidiota* and of *Copris* have been mentioned above (*p.* 184) as having been sent from a tea garden, but in addition I have before me now a third grub, *viz*., that of a Longicorn beetle (*Reg. No. 103*) which has been reported as doing much injury to the tea. The Longicorn (CERAMBYCID) beetles are mostly dangerous wood-borers.

A TREATISE ON TEA.*

A scientific dissertation on what tea-planters vulgarly call tea-bugs does not promise to be of absorbing interest. For a moment a flutter of hope is raised when the savant opens with an allusion to his *explorations* in the not un-mapped district of Kangra, and we congratulate ourselves he is about to invest it with some of the fascination that temporarily hangs over, say Klondyke. But from Kangra to Klondyke is a far cry, and the prospect of exciting adventure is quickly dispelled when the reader dips into the leaves of Mr. Watt's volume on *Tea Pests and Blights*, vainly seeking the cheerful powers of description that enlivened Fortunes books about China and its tea districts, and discovering only a tome full of peculiarly dry facts. The book will with difficulty interest tea-planters, a body of men who, as all the world knows, invariably fall asleep over their *Pioneer* after dinner, and are not to be appealed to by any form of literature excepting tea broker's disparaging reports and valuations on their samples, and, occasionally, perhaps a printed news letter from their own district that pokes fun at their daily life and habits.

And yet, notwithstanding, the entire absence of light and sweetness in its pages, Mr. Watt has written a book that deserves much commendation and will repay intelligent study. Tea holds the fifth place of precedence in the roll of Indian exports, and any work that helps the industry to understand itself better is deserving of cordial recognition. The literature of tea, both ephemeral and in volume form is sadly flaccid stuff. Since the *Indian Tea Gazette*—a periodical which did a vast deal of good, and diffused an immense amount of valuable practical information in its day—expired from lack of support from those it tried so hard to serve, the tea industry has not been adequately represented by any journal worthy of the name. As for Gold Medal Essays and fugitive works on tea planting, which our forefathers were guided by a quarter of a century ago, they have long and rightly been consigned to the limbo of the obsolete.

If we have a fault to hint at in Mr. Watt's book it is that it is too scientific for our taste, and that he is a little apt to cavalierly pooh-pooh practice when he is laying down theory. This mere especially in the first portion of the volume, which is devoted to the treatment and cultivation of the tea plant, and interests us far more than the too technical second part, with its staggering array of scientific Latin names in blocktype. Why cannot surgeons and scientists drop Latin? Fancy any sensible man calling a *janwar* an *Aspidiotus Cyanophylli* when he can damn it off hand, succintly and suitably as a "scale-bug"? Conceive a tea planter whose one aim in life is to pull off a five maund per acre crop and get an eight anna average for it, seeking inspiration in three hundred dragging pages plentifully be sprinkled with scientific designations similar to the above. It is we presume for his exclusive benefit that the book is published by what he has recently apostrophised as "a kind and powerful Government." If so we hear it is not "popular" enough for its purpose. There is too much of the economic study in it: it is too prolix to be perspicuous; and as a practical *vade mecum* it wants more one-syllable words.

On the other hand we willingly admit that Mr. Watt has written a learned and exhaustive treatise on *Tea Pests and Blights*, as he who runs may read. Those who suffer from these pests will do well to wrap a wet to tcwel ronnd their heads (their own heads), and refer to Dr. Watt for information and advice. They shall learn in his book all about mosquito, green fly, red-spider, aph s (a single individual of which can, if unchecked, be the ancestor—Mr. Watt informs us—of 10,000,000,000,000,000 of its own species in three month's time, the unprincipled monster!) and several other protoplastic organisms some of which might come, perhaps, as not an unmixed curse to planters behindhand in their outturn, who, peradventure would on occasions welcome their occurrence with the enthusiasm they accord to the three benevolent hailstones, which timely constitute a storm and an excuse for reducing estimates by twenty thousand pounds. Certes there are som e pests and blights described by Mr. Watt in very minute detail whose life history, however much it enthrals the pedant, can have but nominal interest for the planter, notwithstanding the portentous hints of possible calamity that Mr. Watt lets drop *anent* some of them in language solemn enough for the bubonic plague.

Take the caution to Kangra for instance. It is a district which " may be said two have two pests of any consequence. Neither should be viewed lightly, since it is possibly an accident, more than anything else, that they have not yet assumed gigantic proportions." These two pests are a scale-bug and a basket-worm, and we venture to assert that during the last forty years they have not lessened the Kangra aggregate tea crop of say, 60,000,000 by six thousand, we had almost witten six hundred, pounds of tea. Forty years of consecutive "accident" should set Kangra planters fairly at their ease in regard to *Aspidiouts Theæ* and *Amatissa Consorta.*

Apropos of Kangra tea pests we may mention an incident about the red spider and its occurrence in the Valley which may be new to Mr. Watt. Referring to the necessity of studying the habits of this pest more closely, he writes, "Experiments should be performed in every district. Why should we, for example, be unable to say where the red spider hibernates?" Taking this as a test it may be observed that about fourteen years ago the red spider was introduced into Kangra Valley by a planter who imported some high *at* tea seed from Assam. A few months after the seed arrived a ten acre plot of tea in his garden developed red spider in its acutest form, and absolutely stopped flushing in mid-season. That planter's feelings were quite too harrowing to describe, He believed he had not only ruined himself; but his innocent neighbours by introducing the veritable tea plague into the district. He saw himself handed down to the after ages as the villain who killed the Kangra tea industry. His courage failed him to confess his crime. He kept mum. Never a word said he. He lived in guilty but silent dread, hypocritically pretending to enjoy his pegs, awhile he hugged his horrible secret in his breast. The winter came. The red spider hibernated. Where? Presumably on the Better Land—the land from which there is no return, for it certainly never appeared again in his garden. To this honr no one but that planter knows that fourteen years ago ten acres of tea were for a single season red spider stricken in Kangra Valley, and that happily the pest failed to resurrect the following spring. Its exploration of Kangra involved it in the fate that awaits those who intend to explore Klondyke. And it is in the light of this illustration that we think Mr. Watt takes some of his pests and blights a little too seriously Ignorance and idlenesss are far more dangerous foes to successful tea planting and the shareholders of tea companies than all the plant microbes Mr. Watt warns us against. With ignorance Mr. Watt seeks to battle in his first nine chapters, in which he discusses the treatment and cultivation of the tea bush. His very pertinent remarks on the selection and improvement of tea seed may be cordially commended to

* *The Pests and Blights of the Tea Plant, being a report of investigations conducted in Assam, and to some extent also in Kangra."* By George Watt, M.B., C.M., F.L.S., C.I.E., Reporter on Economic Products to the Government of India.

Calcutta agents and merchants, who sell the expensive article, in the hope that their consciences may be pricked. The chapters on pruning and picking tea bushes are full of theoretical wisdom, and will suggest practical experiments that may lead to valuable results. But it must always be born in mind that nature is over fond of sports and eccentricities. Every one who has daily and carefully made a study of the gradual development of a first flush on a pruned tea bush, will have been startled scores of times by seeing buds coming away from spots where theory and Mr. Watt's diagrams ignore them. Incidentally we may say that we totally disagree with Mr. Watt's dictum that a *banji* bush (*i.e.*, one whose tea shoots have prematurely opened out and ceased growing) should not be plucked. He attributes *banji* "to the want of energy in the entire plant," and prescribes rest. In our experience it is more often due to bad pruning, drought, wind, cold, and even excessive rainfall without compensating sunshine, than to want of stamina in the bush. In such cases it is of absolute and vital importance to pluck *banji* leaf; for it is an indisputable fact that an unplucked *banji* bush will be sulking in idleness, when its picked neighbour alongside is in the full fig of a new flush. Similarly we do not agree with Dr. Watt that continued cropping must necessarily exhaust and wear out a bush. We know of plantations forty years old and more, that are yielding larger and better crops to-day than ever they did before. This is due to improved cultivation, and better, though more frequent plucking. The older the bush the larger the root, and it is root power that gives leaf. If due provision is made to obtain a healthy leaf-bearing surface, and sufficient stimulant allowed in the shape of high cultivation, we would infinitely rather own a plantation of sixty year old bushes, than one of six year old bushes.

There are several other points we had marked for criticism from the practical point of view, but they are too technical to be treated with any chance of interesting. But we may briefly state that although Mr. Watt considers "the presence of old wood in the stem (of a tea bush) must be injurious to the planter's aims and object," the practical planter, who seeks to turn out a good liquoring tea, knows for a certainty that to do so *plenty*, of old wood in the body of the bush is essential. And finally, we cannot agree with Dr. Watt that the *sau* tree (*Allizzia Stipulata*) is always beneficial to tea. In Kangra at this moment there are many patches of bushes growing under *sau* trees which in this season of drought have actually not flushed at all, whilst outside the limit of the malign influence the surrounding plants have yielded their ordinary crop.

As a book of scientific research and theoretical teaching Mr. Watt's work is quite the best at the disposal of the tea industry. We should be sorry not to see a copy on every planter's book-shelfs: but we should be more sorry if the planter had not some sound practical experience of his own, by the light of which to study it.

INDIAN TEA FOR PERSIA, ARABIA, TURKEY AND EGYPT,

INTERESTING CORRESPONDENCE.

Messrs. W. S. Cresswell & Co., the well-known Tea Brokers of 10, Hare Street, Calcutta, have sent us the following very interesting correspondence:—

Dear Sir,—In December last, we wrote to the British Consuls in Persia, Arabia, Turkey and Egypt, to enquire into the state of the tea trade there, thinking that the replies would be interesting to merchants and planters in this country. We enclose what replies we have received, which will show you that there is still room for furthering the consumption of Indian teas outside Europe, 42 per cent, of the teas sold in Calcutta, are taken for ports outside Great Britain. Only 6½ per cent. of the Indian teas sold in Mincing Lane are taken for outside markets. With another 200,000 chests sold in Calcutta, the outside markets would develop considerably more than hitherto, and instead of only 42 per cent. being taken, the consumption would be nearer 60 per cent. and the London market greatly eased by the supply being brought nearer the demand, unless something be done to regulate these supplies, we shall soon go back to the old fancy price of 4½d. for common kinds. The position at present is a very strong one, *why not make an effort to keep it so?*

BRITISH CONSULATE, BAGDAD, TURKEY; *23rd January* 1899. No. 13.

To Messrs. W. S. CRESSWELL & Co., 10. Hare Street, *Calcutta.*

GENTLEMEN.—I have the honour to acknowledge receipt of your letter, dated the 5th December 1898, in which you make certain enquiries regarding the tea trade in this country. I enclose a memorandum, which contains the several questions in your letter under reply and the answers thereto.

With reference to the remark in your letter that all teas sold in the Calcutta market are absolutely free from any impurities, it seems probable that the native merchants who buy the tea in Calcutta or Bombay adulterate it before export so as to be able to lay it down in Bagdad at a low cost.—I have the honour to be, Gentlemen, Your most obedient servant (Sd.) P.J. Melvill, *Major, Acting British Consul-General, Bagdad.*

MEMORANDUM.

Question.—Is it possible to find out how much tea passes through Turkish Arabia, and to what destination and whether it be China or Indian or both? *Answer.*—It is impossible to obtain entirely reliable figures, but it may be said that the average quantity passing annually through the Bagdad Custom House during the past three or four years has been nearly 5,000 cases of, say, 100 lb. each, say, 500,000 lb. Some 80 to 90 per cent. of this tea goes to supply the markets of North-West Persia. The great bulk of the tea imported is Indian and is known in the trade as "Calcutta" tea; only a small quantity (perhaps 5 per cent.) comes from China and Java.

Question.—Do the people of Turkish Arabia drink much tea, if any, and what do they have to pay per. lb. for it? *Answer.*—The people of Turksh Arabia generally are not tea drinkers. This is clearly shown by the fact that, of an annual import of some 5,000 cases, about 750 cases are sufficient to supply the wants of Turkish Arabia, of which Bagdad is the emporium. The present wholesale price of the description of "Calcutta" tea most freely sold in Bagdad is about Grand Seigneur Piastres 11¼ per Constantinople oke (2·83lb.) equal at exchange of G. S. Piastres 115 per pound sterling on London to about 8¼. per lb. *Question.*—Could you procure a sample of tea selling in your city, also letting me know how it is packed, size of boxes, etc.? *Answer.*—A small sample of the "Calcutta" tea selling about G. S. Piastres 11¼ is enclosed.

The tea is usually packed in cases weighing 80lb. to 110lb. the net weight being marked on the case. The tea is enclosed in leaden wrappers in a wooden case with a covering of skins and gunny. It is sometimes also packed in a strong tin case with wooden boards at the ends, bound with two iron hoops. The tea in these cases is usually in bulk, but sometimes it is packed in 1lb. tin boxes bearing a label with an attractive design with usually the name of the native importer in Arabic or Persian.

Question.—Do you think there is room for further development in this particular trade? *Answer.*—The trade is at present worked very cheaply by native merchants having agents in India. It seems to be increasing, but there would appear to be no room for a sudden development in this particular trade. It is *possible* that, with the present low prices of Indian teas, there may be a gradual change in the habits of the people of Turkish Arabia, that is, they may, after a time, come to drink more tea and less coffee. At the same time lower prices nearly always mean larger consumption, and, and if the trade in Calcutta

can put a tea on the Bagdad market at a less price than that quoted, the trade will probably expand. The market here requires cheapness before quality.

Question.—Is there any import tax on tea? *Answer*.—On tea sold for consumption in Turkish Arabia the duty is 8 per cent *ad valorem*. If, however, it is sold for export direct into Persia, the duty is a transit one of 1 per cent. only. In the letter case, of course, the price paid here by merchants buying from the importers for the Persian market is proportionately less: *e., g*., as against piastres 11¼, quoted above the quotations, if selling for Persia, would be about piastres 10½ (Sd.) P. J. Melvill, Major, *Acting British Consul-General, Bagdad*.

BRITISH CONSULATE, SMYRNA, TURKEY; *14th January*, 1899.

To MESSRS. W. S. CRESSWELL & Co. 10, HARE STREET, *Calcutta*.

SIRS,—In reply to the queries contained in your letter of the 5th ultimo, I have to state as follows:—

1. In 1897 about 168,500lb. of tea were imported at Smyrna, estimated value about £10,900, for local consumption. It was chiefly blended tea, *i. e*., China and Indian teas mixed.

2. Natives of this country do not drink much tea, coffee being the beverage consumed instead. *The demand for tea is, however, increasing every year*. Price paid is from 2s. 6d. to 3s. (retail, per lb.)

3. One solitary sample is not likely to prove of much use, but can be procured and sent if really desired and freight prepaid.

The article sold here is packed in chests tin foil. of 56lb. or in tin boxes of kilo 1 kilo=2·20lb, and its fractions ½, ¼ and ⅛. These last are imported by the French Colonial Company.

4. *There is decidedly room for a further development in this trade.*

5. The import duty on tea is 8 per cent. *ad valorem*.

6. I think it would be unadvisable to attempt too large a business at first as the country is not a rich one, and, as stated above, the national taste is on the side of coffee, which is consumed in great quantities.—I remain, Sir, Yaur obedient servant, (Sd.) H. A. CUMBERBATCH, *Consul*.

BRITISH CONSULATE, TRIPOLI, NORTH AFRICA; *15th January*, 1899.

DEAR SIR,—In reply to your enquiry, dated the 6th ultimo, addressed to Tripoli, Arabia, I beg to inform you that the import of tea averages between £4,000 and £5,000 a year, the bulk of which is purchased here for export to the Soudan by the trade caravans proceeding south to Wadai, Kano, Sokoto, etc.

The qualities are as follows:—

Son Mec	... ½ chests 0 3 10 at France	2 10 per kilo.
Ditto	... ...	1 90 „
Young Hyson...	..	1 70 „
Ditto	.. ..	2 0 „

Small quantity of Indian tea in chests of 1 0 4 at 1s. 4d. to 2s. per lb. (all sales at 4 months date.)

Packing.—Light wooden cases, lined with leadfoil, matting and canvas covering. The caravan trade being on the decline, I do not think there is room for further development. The local consumption is small; the import duty is 8 per cent. *ad valorem*.—Yours faithfully, (Sd.) T. S. JAGO, *Consul General*.

BRITISH CONSULATE, SALONICA, TURKEY; *16th January*, 1899.

To MESSRS. W. S. CRESSWELL, & Co., *Calcutta*.

GENTLEMEN,—In reply to your letter of 5th December last relative to the importation of tea in this province, I am instructed by Her Majesty's Consul General to communicate to you the following information supplied to him by a firm of merchants here.

The importation of tea, mainly of Indian origin, amounts to 200 or 300 original cases in the season. The greater part of this is for consumption here and some for other parts of the province.

The use of tea is not general among the population, but appears to be extending with fair rapidity.

I send you separately four samples of the qualities known here.

Tea is always packed in the original cases.

The import duty is 8 per cent, as on all goods admitted into Turkey, and the price is from 2s. 3d. to 2s. 10d. per lb. according to quality.

Should you wish for any further information I should recommend you to apply to the merchants referred to above, Messrs. Jenny and Vock, a Swiss firm of Commission Agents occupying a good position here, who have expressed their willingness to enter into communication with you.—I am, Gentlemen, Your obedient servent, (Sd.) W. J. HEATHCOTE, *Consular Assistant*.

USCUB; TURKEY IN EUROPE; *22nd January*, 1899.

To W. T. CARTER, ESQ.

DEAR SIR,—I received your letter of 7th December last (as also the one addressed to Monastis, I being in charge of both districts), and I have made some inquiries as to the consumption of tea here.

The annual consumption in this Vilayet (Kossova) is about 1,500 okes (an oke is 2 1-5b.)

Except for a small quantity of Russian tea, nearly all the tea consumed comes from Asia Minor. It arrives at Constantinople or Salonica in cases of 50 kilogrammes each. In those towns it is repacked in tins of 1 oke, ½ oke and ¼ oke sent to Uscub.

The price at Constantinople or Salonica of the tea in general consumption here is 30 piastres the oke (110 piastres=fst. 1) and it sold here at 50 piastres the oke.

The Russian tea is sold in packets of 100 grammes at 5 piastres the packet.

I should say that probably the tea consnmed here and said to be from Asia Minor is the same as you speak of as sold to Persian Gulf or Trebizonde merchants.

Hoping that this information may be of use to you.—I am, Sir, Yours faithfully, (Sd.) CHARLES S. SAMPSON. *H.M. Vice-Consul*.

H.B.M. VICE-CONSULATE, VAN, TURKEY-IN-ASIA; *22nd January*, 1899.

SIR,—In reply to your letter of inquiry regarding the sale of tea in province, I beg to inform you that all tea imported here comes from Constantinople merchants.

It is said that these merchants import in large cases from India, but the tea is remixed and packed at Constantinople before forwarding into the interior.

It is packed in small fancy tin boxes containing from 25 dirhems to 3 okes each box. 400 (dirhems=1 oke=2¾lb.)

One of the small boxes is forwarded as a sample. Inferior teas are in small canisters 4 to 6 inches high. Occasionally rectangular tin boxes 13 by 9 by 10 inches are used.

It must be remembered that all goods to this province must come by pack transport chiefly from Trebizonde, sometimes from Alexandria. It might be possible, however, to open a more direct trade with Van through Bagdad and Mosul; the caravan distance from Bagdad and Constantinople is about the same.

Since ten years ago people, both rich and poor have begun to drink more tea, and until three years ago the trade was increasing. The disturbances three years ago have much impoverished the country and there is no money to buy much besides bread and the absolute necessaries of life. This year there are fears of a partial famine. The import last year to Van was 3,000 okes or 8,250 lb.

The present political situation is by no means clear, and there is no room at present for any further development of the trade.

The import duties are all paid in Constantinople. There are none here.

There are three kinds of tea imported here.—

(1)	80 paistres an oke	... 6 shillings a lb.
(2)	40 „	... 3 „
(3)	20 „	... 1s. 6d. „

Samples of each are enclosed in the sample box.

As far as I can judge, all these have but a very remote connection with the actual tea plant.

Tea is not usually sold by the oke, but in the fancy boxes such as the one I send, which, filled with the second quality, is sold for 12 piastres or 2s. 6d.

A canister 2½ feet diameter and 3⅛ feet high full

of the worst quality is sold for 3½ piastres or 8¾d.

A canister 4 feet high and diameter of second quality is sold for 5 piastres or 1s. ½d.

If the condition of the country should improve *I should think there would be a good demand for tea here.*

The bagdad, Mosul-Van route would be the best, as the middlemen in Constantinople would be saved.

A central agency at Bagdad with sub-agents at Mosul, Bitlis-Van and Diarbekr ought to do a good trade in cheap tea of a good quality.

The people are not at all satisfied with the stuff represented in the present samples—I am, Yours, faithfully, (Sd) F. R. MAUNSELL, *Capt. R.A., H.B.M., Vice-Consul.*

BEIRUT, TURKEY, 25*th January*, 1899.

SIR,—I am directed by H.B.M's Consul-General to reply to your questions regarding tea in your letter of the 7th ultimo.

6,000 okes—15,000 chests tea passes annually through Beiruit. Destination—Beirut, Damascus, Jaffna, and Jerusalem receive an equal quantity.

Tea is not a national beverage, foreign residents consume the most. The quantity imported is drunk.

Indian teas, price 7d. to 9d per lb. China teas, 4 to 7 per 3lb. packets. China teas packed in 10 or 20lb. chests. Indian teas in 20 to 80lb. chests. The import duty is 8 per cent *ad valorem.*

There is little chance of developing the Trade—I remain, Yours very faithfully. (Sd.) J. E. CROW.

BRITISH CONSULATE, ANGORA, TURKEY, 27*th January* 1899.

DEAR SIR,—The following few particulars which in accordance with the request contained in your letter of the 5th ultimo, I have obtained respecting the consumption, etc., of tea in the town of Angora and immediate district are, I trust, what you require, I should, however, state by way of preliminary that as no official statistics whatever are procurable, the estimate given of the amount consumed must be regarded as at best approximate only.

The answers to your questions are as follows:—

1. No tea passes through the province of Angora, such as is imported being used in the district itself. The tea, I am informed, is of Chinese origin and comes through Russia to Constantinople, from which town it imported here by rail directly.

2. The annual consumption of tea in Angora and district is estimated to amount to 2,500 okes (the oke being taken at 3¾lb.) of a value of some £500, which would give an average price of 4s. an oke or about 1s. 5d. per lb.

As you will see by the above figures, Angora can hardly be said to contain a tea-drinking population. Nevertheless I am told that during the last three or four years there have been signs *that the article has been gradually gaining ground, and that the families who formerly drank nothing but coffee are now replacing it by tea.* The same, though to a less degree, may be said of the Turkish peasants among whom the custom has been introduced by immigrant Circassians from the Caucasus.

3. I enclose four samples of the tea sold at Angora with price per oke of 2¾lb. attached, and I would ask you to note that the sale of the quality marked No. 3 at 3s. 6d per oke, or about 1s. 3d. per lb., amounts to 90 per cent. of the total consumption.

As to the method of packing, etc., I am informed that the tea is forwarded to the export houses at Constantinople in wooden chests contain from thirty to thirty-five okes (82-85lb.) each. From Constantinople it is sent to the dealers here either in these same boxes or in tins containing from ½lb. to 6lb. each, according as the order may have been, wholesale or retail. I enclose mark on the chests which contain quality No. 3 at 3s. 6d. per oke. I may add that the wholesale buyers at Angora are allowed 91 days for payment by Constantinople firms, the Turkish lira, moreover, being accepted at 112 piastres, whereas it is taken in the market at only 108 piastres.

3. The import duty on goods entering the Ottaman Empire is 8 per cent, *ad valorem.* There is no octroi at Angora.

4. With regard to your question whether there is room for further development in this particular trade, I can only say that while, as already stated, there has been an increase during the past few years in the consumption of tea, this increase has only been very gradual and is likely to continue to be such for some time. In other words, British teas if introduced would have to compete with the Chinese article for a share of the rather modest annual consumption now existing, and what chances of success they might have I can of course offer no opinion, as it would depend on the taste of the consumer. In any case I am informed that the article introduced should be of the same quality or a little superior to the sample which I have numbered 3 and of a slightly lower price, say, 1s. 1d. per lb.

As regards method of doing business, I do not see how the present system, *viz.*, of obtaining the article through the large import houses of Constantinople, could be changed, for even if a dealer here were to attempt to enter into direct relations with, say, an Indian firm, he would have to employ a commission agent at Constantinople to clear the customs for him and forward the goods on. I can of course supply you with names of Angora grocers (there are no exclusive tea dealers) if desired, but it would appear to me that the better course under present conditions would be to apply to some old established firm English for preference, at Constantinople who would undertake to push the sale through agents here and who would be in a better position than I am to say what the chances of a sale might be.

I should add that the figures which I have given above only apply to Angora and immediate district. There are two other centres and the province, *viz.*, *Caesarea* and *Yazgat*, at which the estimate annual consumption amounts to some £500, respectively.

The port through which Caesarea obtains is tea is, I am told, *Mersina* in the Mediterranean; that for Yuzgat *Sumsoun* on the Black Sea. If desired I will endeavour to obtain samples of the teas used at these two places with prices and particulars attached as in samples endorsed in present letter.

I am, dear Sir, Yours very faithfully, (Sd.) H. S. SHIPLEY.

H.B.M. CONSULATE, DAMASCUS, TURKEY, 30*th January*, 1899.

GENTLEMEN,—With reference to your letter of the 7th ultimo asking me to give you information about the consumption of British-grown tea in this province I have to inform you that about 100 boxes of Indian tea are consumed yearly in Damascus and district, each box containing from 100lb. to 132lb. Of China tea the yearly consumption is so small that it is hardly worth mentioning, perhaps 2 or 3 boxes similar in size to those in which Indian tea is imported.

The habit of tea drinking is *undoubtedly growing in this city* and the few towns which are comprised within the limits of the province, but as the greater part of it (the province) is inhabited by Bedouins, Druses, Circassians, and other wild and semi-civilized races to the great majority of whom tea is a novelty as well as a luxury, its consumption is necessarily very restricted.

I am forwarding to you by this post four different samples of tea, being the kinds for which there is most demand here, of which the prices (wholesale) range as you will see from 9d. to 1s. 1½d. per pound. The wholesale price of China tea, on the other hand, ranges from 1s. to 4s. the pound.

As regards packing, I am given to understand that the boxes, which, as stated above contain from 110 to 132lb., are tin lined.

The import duty on tea, as on all other articles imported into the Ottoman Empire, is 8 per cent. *ad valorem.*

The further development of the trade is not likely, considering the rough and uncivilized character of the majority of the inhabitants, to be either rapid or extensive. On the other hand, it is undeniable that such consumption of tea as exists has made very rapid strides *in the towns* of late years.

Moreover, thanks to British enterprise and capital, a Railway is now in the course of construction which will connect St. Jean d' Arc, Haifa and Damascus, and so tap a considerable tract of country which no railway has hitherto reached, so that the demand for luxuries, such as tea so considered in this country, *will undoubtedly increase in the future.* On the other hand, it should be remembered that coffee, though dearer than tea is *the* beverage of the country, while the latter is not. And even those who are most accustomed to the drinking of tea only indulge in the habit during the winter or cold months all through the summer and the autumn they drink coffee as being, so it is held less heating. Nevertheless the habit of tea drinking is *certainly growing* though chiefly confined at present to the towns. I am, gentlemen, Yours faithfully, (Sd.) W. S. RICHARD, *H. M. Consul.*

CAESAREA, TURKEY; 31*st January*, 1889.

MESSRS. W. S. CRESSWELL & Co., *Calcutta.*

DEAR SIRS,—I do desire to make a work on tea now I will give information on this work.

In our province the merchants sell much tea by boxes or by pounds, but now usually by pounds.

Our province people can pay for a pound, *viz.*, four hundred drams, for a good one from fifteen to sixteen piastress.

In Turkey there is import tax on tea, the merchandise which come from foreign countries import tax is 8 per cent.

If you make trade with us I hope that other merchants cannot sell as us. I hope you give answer to my letter. There is nothing to read for this time. Yours truly, (Sd.) Y. ZAMBAKJIAN BROTHERS.

My address is this:

Y. ZAMBAKJIAN BROS., (CAESAREA), KASIRI, TURKEY, ASIA.

JERUSALEM, TURKEY, 11*th February*, 1899.

W. CARTER, ESQ., CALCUTTA, *India.*

DEAR SIR,—In reply to your letter of the 5th ultimo I beg to state that the tea imported into Palestine is for the most part of an inferior quality, and is consumed by the Jewish population and Russian pilgrims.

The consumption, however, of tea in this country is *on the increase*, the natives having of late years taken to tea drinking, but as a rule they are indifferent to the quality. The price generally paid for the ordinary, kind is at the rate of 1s. to 1s. 3d. per pound retail sold in ¼lb. packets and it is a blend of China and Indian tea (sample No. 1.)

The Europeans and better class of the inhabitant, consume generally Ceylon tea or Orange Pekoe which are retailed at 1s. 6d., to 2s. 6d. per pound and is sold in bulk and in 1lb. packets (sample No. 2.) I forward samples by post.—I am, dear Sir, Yours faithfully, (Sd.) JOHN DICKSON. *H.M. Consul.*

KHARPUT, TURKEY, 17*th February*, 1899.

MESSRS. W. S. CRESSWELL & Co., *Calcutta.*

GENTLEMEN,—In reply to your note of the 7th December last asking for information respecting the tea trade in this province I beg to forward the following particulars:—

The amount of tea used in the province during the year is about two thousand okes (the oke being nearly equal to 2¾lb., distributed as follows:—

Kharput and the neighbourhood ...	700okes.
Malatia district	700 "
Arabhia	500 "
Egin	100 "

As regards the country of origin of tea imported into this province, I am informed that about 75 per cent. is Chinese tea, the remaining 25 per cent. being Indian of better quality than the China tea and higher in price.

The quality of the tea used is for the most part very inferior, only about 10 per cent. being fairly good.

The import is obtained entirely from Constantinople, there being no direct trade with China or India.

At that port tea, like other imports from foreign countries, is subject to a duty of 8 per cent. and in addition to this an interprovincial duty of one per cent. is levied on its introduction into this province.

Owing to the defective condition of the means of communication in this part of the Empire the cost of transport is very heavy and trade is thus greatly hampered.

Under these circumstances, and in view of the poverty-stricken condition of the province, there is but little hope of any great expansion of the trade taking place at an early date.

The tea as it comes from Constantinople is packed in comparatively small tins holding only a few pounds each.

Prices vary twenty-eight piastres (=4s. 8d.) the oke to fifty piastres (=8s 4d.)—I am, Gentlemen, Your most obedient humble servant, (Sd.) I. FRANCIS JONES.

HER MAJESTY'S LEGATION, TEHERAN, PERSIA; 18*th February* 1899.

MESSRS. W. S. CRESSWELL & Co., 10, HARE STREET. *Calcutta.*

SIR,—I have received your letter of the 2nd December 1898 regarding the prospect of the tea trade in Persia.

I am making enquiries at the various trade centres, and will inform you of the results. Owing to the extreme slowness of communication in this country, I fear it will be some months before I can send you full information; but you shall have it as soon as possible. The import tax on tea is 5 per cent *ad valorem.*—I am, Sir, Your obedient servant. (Sd.) H. M. DURAND.

BRITISH VICE-CONSULATE, MOHAMMERAH, PERSIA; 24*th February* 1899.

SIR,—In reply to your letter of 2nd December regarding the tea trade in this province, I have the honour to inform you that the import of *tea is increasing and is likely to increase.*

The tea is Indian, Ceylon, China and Japan and is shipped by British steamer from Bombay.

The imports for the past three years were as follows:—

Year.	Landed at Mohammerab	Reshipped to Karun	Transhipped India to Karun Ports.
	Cwt.	Cwt.	Cwt.
1896	191½	65	301
1897	191	133½	240
1898	388½	82½	797½

The second column should be deducted from first to show local consumption.

The following varieties are sold in Mohammerah Bazar at retail price given.

[*Exchange*, Krans 35=Rs. 10.]

1. Java tea, 200 tins of about a pound, at Krans 150.
2. Calcutta tea, Krans 10 per 6lb.
3. Ceylon tea, Krans 11 per 6lb.
4. White China Tea (Pekoe), Krans 5 per lb.
5. Khaldar (Java Pekoe), Krans 14 per 5lb. tin, or Krans 30 per 1lb. tin.

Indian and Ceylon is either loose or in packets packed in cases of 100lb and 200lb. Paper packets generally bear a label in Persian giving the name of some Persian trader either in India or here.

Samples are enclosed of above.

Import dues of tea if owned by Europeans 5 per cent *ad valorem* once and for all.

Tea imported by Persians pay no customs at Mohammerah, but an octroi of Krs. 0·025 per lb. package, with other charges including literature coming to about seven krans per case. If re-shipped it pays customs on shipment and at other places in the interior.

Through native cargo pays customs at Shushter Krans 12·75 per mule load of 2 large or 4 small cases,} it is liable to further dues at other places beyond Shuster.

The British India and the Bombay and the Persia Steam Navigation Companies issue through Bombay B L from Bombay to Nasri and Shushter on the Karun.

A mule road from Nasri (Ahuaz) to Ispahan is now being construoted and will probably lead to further trade with the interior by the Karun ronte.—I have the honour to be, Sir, Your most obedient servaut (Sd.) W. McDONALL, *H. B. M. Vice-Consul, Mohammerah.*

BRITISH CONSULATE, ISPAHAN, PERSIA, *26th February* 1899.

DEAR SIR,—Your letter of 2nd December to Her Majesty's Representative, Yezd, has been forwarded to me heré, tbe Yezd district being in my charge, I, however, have no ageut at Yezd, and am not in correspondence with anyone there to whom I can apply for the necessary information.

I do not believe that there is much chance of increasing the tea trade of the place, it is entirely in the hands Parsi merchants, who have there agencies in Bombay, who work it, you may be sure, for all that it is worth. I see by referring to my report of 1896 No. 1662, Circular report, that during the year 1895-96 the importation was 2,800,000lb. whereas in 1891-92 6,000,000 (six millions) was the figure. The closing of the Russian markets in the north was the cause of this great decrease.

With regard to this market in

1892-93	4,844	Boxes were imported.
1894-95	4,479	do
1896-97	3,117	do
1897-98	6,314	do

The major portion of this tea is Indian, about 1-10 may be taken as China, that is, the tea which finds most favour with the Ulima. Small consignment also come from Java from time to time. The supplies which come here are for the local market and the sonrrounding districts. I cannot find that any goes north. There is not very mnch tea drunk the people are poor aud cannot afford to expend mnch on what to them is luxury.

Indian tea costs from Krans 32 to 40 per manshah,
China tea do do 70 to 110 do
Krans 3·50=one rupee, 52 krans=£1 and 12·60 lb.=manshah.

China tea is packed in big boxes, each containing 4 small boxes weiging about 28 lb.

Indian tea is packed in boxes lead foil, each containing about 100lb. I have seen it also in 1 lb. packages. This came from Kangra Valley. Also I have seen it in wood boxes, each box containing four tins of 20lb, of tea. These have come from Calcutta

There is an import tax of 5 per cent. on all tea brought in by Enropeans.

I do not think that there is room for any development of the trade. European merchants here, who have connection with India, have tried the market and have not found it responsive.

If I can give you any further information I shall be glad to do what is in my power.

I am, dear Sir, Yours faithfully, (Sd.) J. R. PREECE.

HER MAJESTY CONSULATE ERZEROUM, TURKEY, 4th *March* 1899.

DEAR SIRS,—Tea can be sold bere for about £5,000 to 6,000 stag. per yard in Erzeroum only. But as there is ground to sell also tea for the north of Persia, for this year tea will be consnmed for £10,000.

Either for our city or for Persia Indian teas are nsed; but a little quantity of China white tea. The people of our province *drink much tea*, and from year to year the consumption is growing.

Per this mail I send yon ten samples of tea in fine packages to show you the qualities which are sold in our country. No cheap teas are wanted, especially for Russian buyers, for Tabrig, too. Only small quantity of better qualities is wanted for Erzeroum and for Tabrig, this at 10-10½d. per lb. in Calcutta. Per the next mail I will send you samples of those nice teas, too.

Note that all the teas for this conntry must be flowery (fair appearance.) Black teas are never wanted here.

Tea is coming us per chest of 1001-101lb., but the qualities up to 6d. per half-chest of about 50lb., net. Chests must be strong, and wrapped by strong Hessian cloth, and all round chest iron rings. Boxes of 10lb., 20lb., 30lb. net flowery are selling also in large quantity.

By experience I know that there is room for further development in this particular trade.

As for all goods the tax on t a is 8 per cent., which I pay at Trebiyonde. But if transit for Persia no tax to pay in Turkey.

All tbe teas shipped from Calcutta to Trebizonde are 90 per cent. for Erzeroum trade. But the Persian FUTH ship also for Trebizonde about 10,000 to 12,000 chests, half-chests (from Calcutta) all for Tabriz (Persia, this year. Except FUTH the remainder are for our city. Trebizonde is not but a simple port for tea.

I tested always that the weights of London are exceeding in lbs. For instance a chest of tea sent us from London for 100lb. was weighing here 101·102 lb. net. But Calcutta weights besides are uot exceeding in their weights have represented a deficit of 1-2lb. per each chest.

Sugar bags—28 × 48=2¼lb. red or blue border—are selling in large quantity in this country.

As Indian teas are of British growth, I will try to sell teas hereafter on a large, scale, having already developed business in the north of Persia because Persians like very much Indian teas with long but nice leaves and flowery.—I remain, dear Sir, Yours faithfully, (Sd.) P. H. H. MASSAY, *Lieutenant-Colonel.*

P. S.—Herewith list showing the prices of samples.

I will poiut out to you that sometimes it happens that we receive from Calcutta a nice sample of 20½ chests shipped for us. When the goods arrive I find that 10-12 half-chests are the same as the sample but the remaining eight half-chests are of ordinary quality and not the same.

ERZEROUM *le, 4th February.*
Calcutta price, Erzeroum selling prices.

			Chs.	d. per lb.	P. per ocg.
F.P. No.		162-174	3½	4¾	22½—13½
c					
,,	,,	199-205	7	4	9¼
,,	,,	187-196	10	4¼	9½
,,	,,	252-253	2	3¼	9
,,	,,	11-57	47½	6¼	13¼-15
,,	,,	78-101	24	4¾	12½
,,	,,	317-340	4½	8¼	18
,,	,,	851-880	30½	tipy 8½	18¾
,,	,,	881-900	20	,, 7	15
E. P. C. Ceylon tea			7½	35 Cts.	12½-13½

An Ocg. is equal to 2¾lb.

Trebizonde expedite has to receive one shilling of commission for each chest.

Tax 8 per cent. on the price fixed in Trebizonde Custom Honse.

Carriage from Trebizonde to Erzeroum about 2d. per ocg. per the back of horses or per oxen-carts. 18s. 2d. make 100 gold Piastres.

From Trebizonde to Tabriz tea is going per caravans of camels. They pay for carriage about 2½ piastres (about 5½d.) from Trebizonde to Tabriz for each ocg.

In Persia the tax on tea is about 5 per cent.

THE EUCALYPTUS IN BRITAIN.

It seems to me pertinent to enquire—is there any future for Eucalypti in England at all, and will they do good there ? I have known persons who would emulate the credulity of the monks in the virtues which they attribute to these strange Australian trees. A broken Eucalyptus-bough or a few leaves were in their opinion sure to be a defence against influenza and other things—but all this is for the most part beside the mark. In England, as elsewhere, they might be very serviceable for drainage purposes if only they would live, but that seems problematical in the highest degree, and for nothing else is it worth while to take much trouble about them. In your impression of December 3, I remem-

ber reading the following passage: "Eucalyptus Globulus.—I quite agree with 'J. H. D.' in his remarks as to the rarity or difficulty of growing this plant; here, we have plants 16 or 18 feet high that have withstood five winters without the slightest, protection, &c. In my opinion the principal cause of failure to grow is planting them too soon, &c." The writer, who is evidently alive to the difficulty that surrounds the whole matter, is full of hope that it may be somehow overcome. I am sure, I do not wish to daunt him in any degree, but with regard to E. Gobulus I am persuaded that it has not a constitution which is sufficiently hardy for England. It is a great favourite wherever it get on well because it makes a great show so quickly, and my friend the Trappist monk calls it A1, because it gives him no trouble at all; but that is a different thing from the way in which Cavaliere Palice speaks about the same matter. He does not say that Eucalyptus Globulus can be trusted in all places and positions, but he maintains exactly the reverse, and he puts E. resinifera at the head of the whole of them, because it is more reliable than the rest. And this, so far E. Globulus is concerned, I have seen over and over again in the Isle of Wight. It goes on well, say, for seven or eight years or more, and then a more than usually hard frost comes, and ever tree is destroyed.

I remember twenty (or twenty-five years ago receiving a letter from a friend who had a fine place at Westridge, near Ryde, and his asking me to go to him at once. He certainly was not addicted to botany or to the cultivation of trees and plants at all, but, somehow, E. Globulus had found its way into his garden, and had attained to a great size; he was very proud of his tree, but he could not make out the buds, and one spring very unexpectedly, and very suddenly, so far as the owner was concerned, it broke out into blossom, and was a pretty sight to see. I really do not know what this gentleman imagined had taken place. The knob-like buds he had esteemed to be seed-vessels, so far as he had thought about them at all, and the difficulty in his mind was, what then had succeeded them? and he was very slow to believe that his Eucalyptus was blossoming. But that tree gave rise to many false hopes in the Isle of Wight. If E. Globulus could behave like this, and grow so tall, and blossom so luxuriantly, what more could be required? It would certainly take to the Isle of Wight, and the Isle of Wight might have a new possession of great value about which no doubt need be entertained. But what really took place? E. Globulus was planted in fairly large quantity in and about Ryde, and everything went on swimmingly for a series of years. Near Trinity Church in Ryde there were some very large specimens indeed, there were one or two in St. John's Park, the same (I think) in the grounds of Isle of Wight College, certainly one or two in my own garden, and nobody dreamt of any ill coming to them; all boded so well. But tho frost of 1881 made short work of the hole lot, and for sometime there was not a Eucalyptus in the place that was worth speaking of. Now they are coming up again in some plantations and gardens, and they look very promising, but the promise will only last till the mercury in the thermometer goes below a certain point, and the whole thing will be over. This sort of occurrence is by no means peculiar to the neighbourhood where I live. I asked a lady who is a visitor to Rome this winter, and who lives at Falmouth, how it fared with her about this matter, and her answer was, they get on well for five or six years, and then a hard forest come and every Eucalyptus is killed. I have even heard of a fine tree at Bournemouth, which stood the climate there for seventeen years, and at last was cut off. They may do permanently in other places about which I know nothing at all, but the Scilly Isles give the only exception I can think of to a universal rule. [Fota, Mr. Smith-Barry's place near Cork.—ED.]. I may, however, say, that I know nothing about the west coast of Scotland, and how they fare there.

The question, therefore, about them is this. Is any one species so much more hardy and so much more slow-growing than the others as to afford solid ground for hope?

I remember myself hearing some time ago of two names of Eucalypti. I think they were E. Gunni, E. coccifera and another, and these were said to promise quite well for the future in point of hardiness, but I do not know how the promise was fulfilled—it can do no harm if a third one be added to the list—it may prove a failure, like so many others; but E. resinifera has a very good character here, which should not be overlooked.

I would only just add, that I have brought a good supply of seed of E. resinifera from the Trappist Monastery, and I shall not myself want a tithe of it. I will readily send some of it to any one who applies for it to me on my return home to St. John's Ryde, which will be, so far as I can tell at present in the month of April next. H. *Ewbank (Rev.) Rome, Christmas Eve*, 1898. [E. resinifera was figured in our columns, with a descriptive article from the late Dr. George Bennett. See *Gardeners' Chronicle*, August 3, 1872, p. 104. E. coccifera, at powderham Castle, Devon, has often been figured in our columns. See February 7, 1891. We should be pleased to hear the present height of that specimen. The tree a Kew which gets hurt by frost is E. Gunni. E. urnigera is the tree grown at Whittingham, East Lothian. See *Gardeners' Chronicle*, June 30, 1888. We may also refer to an article on February 7, 1891 as containing a summary of our knowledge of these plants, as grown in the open air in this country, ED.].—*Gardeners' Chronicle*.

THE TEA CAMPAIGN.—The *Madras Mail* has some pungent remarks to make in criticism of a local paper thus:—India to act for herself. Now, if Ceylon has had less advantage than India out of co-operation up to the present time, why should she wish to continue a system that is unfavourable to herself; if more, then why should India take the bait that is put before her? As for the "futility" of South India acting independently, we can only say that, in our opinion, a scheme might easily be drawn up that would be within South India's means, and that would give a better return in proportion to the money laid out than the past efforts of either the Planters' Association of Ceylon or the Indian Tea Association have done. This is a bold assertion, perhaps, but, at least, the above efforts have done little for this part of India. The idea that Ceylon and Indian teas can be grouped together, and offered as if they constituted but one series of qualities, appears to us to be fallacious. There is as wide variety between some Ceylons and other Indians as between any Ceylon or Indian and any China teas. South Indian teas are, generally speaking, totally distinct from Assams or Darjeelings, at any rate from the higher grades. Such South Indian teas, as have been offered in the London market lately have been described as "useful sorts." That is what is wanted all the world over, and if South India makes it known in other markets than London that she has *useful sorts* to offer, she will reap the benefit of increased competition among buyers. Whatever our Colombo contemporary may say, we see no reason why India should make terms with Ceylon in respect to tea compaigns in America or elsewhere; and we specially deprecate the idea of South India placing herself in the position of the little streetboy, who steals a free ride at the back of a passing cab. She should push her on wares, not hang on to Ceylon or India's coat-tails.—As for the "Times of Ceylon" remark about "political feeling in Russia against India," our contemporary has so completely misunderstood our reference to political considerations as to try to put the boot on the wrong foot! If our contemporary will but consider that there is no Consular representative of Russia in India, and if he will try to ascertain or to guess the reason, he may possibly comprehend our statement that "political reasons obstruct progress" in regard to a direct line of steamers from Calcutta to Odessa, in rivalry with that which carries cargo from Colombo to Odessa.

FACILITIES FOR MAKING GOOD TEA :—VI.

It is perhaps, a good sign that even the new districts declare that better tea might be made with better soil; for although the declaration may be regarded as a confession of universal poverty of soil, we prefer to look on it as a recognition of the truth, too often forgotten, or ignored, that the soil requires to be liberally treated if it is to yield of its best. What if our soil as a whole is poor? It has yet shown its suitability for the profitable cultivation of tea; and it is far better to know its deficiencies and to supply them, by the aid of agricultural chemistry, than to live in a fool's paradise, or deliberately to conceal facts in a way to imperil a great industry, while injuring individual interests permanently. It is in that view we welcome the declaration from Maskeliya that the "want of richness in the soil" is the great drawback to making better tea. The up-to-date planters of a progressive district are not the men to make a declaration like that, and then to fold their hands and expect the soil to improve under contemplation. No; it will be their endeavour to give the soil what it lacks. With the jât of the bushes "fairly good," they will not be discouraged by the knowledge that the soil is "rather inferior, generally speaking"; and we are not surprised at the conclusion that manuring should be resorted to, to keep the bushes in heart, and enable them to bear the constant plucking to which they are subjected all the year round, though doubt is expressed if direct profits are realizable through manuring "with present prices." But that was written early in October; and since then prices have advanced; while there is reason to hope, with the growing demand, especially outside the United Kingdom, for Ceylon tea, that prices will not run down again to the lowest point reached last year. The factories are, as a rule, well-provided with withering room, machinery and motive power; and that must be a great help in the endeavour to produce good tea; while, with the labour force ample, and pruning practised with the wisdom which avoids severity on the one hand, and postpones the use of the knife too long on the other, nearly all the facilities for making good tea are present. The prices which Bunyan and Ovoca estates fetched only a few days ago in the open London market, proclaims the high position which Maskeliya enjoys as a tea district, and only confirms the correctness of the reply to our circular which claims that the soil, despite its deficiencies and its appearance, grows tea well, though large yields and high quality cannot be expected in combination, and that the climate and the rainfall further contribute to the popularity of the district for residential and agricultural purposes.

In Bogawantalawa, among the drawback to making better tea, are mentioned coarse plucking, want of care in plucking, and deficient withering space. The jât of tea varies on different estates, but on the whole it is fairly good. The soil, too, similarly varies —estates which had grown coffee being more or less worn, while the soil on others is good. The district, we are surprised to learn, is a stranger to manuring—the cost of transport, we fancy, proving an obstacle; but confidence is expressed that the application of manures would be of advantage. Withering space is declared to be decidedly deficient on some estates, and so with machinery; but most estates have sufficient motive power, except during a severe drought when water power fails. Like almost every other district, Bogawantalawa has had labour enough, and more than enough, during the past year; but matters, we suspect, are different now. Severe pruning is held accountable for reduced prices, though the yield has been increased by severity; but in some cases fields have been spared a taste of the knife too long; and in such cases it is claimed that flavour has been maintained. Is it not the case that pruning too long neglected must be generally followed by severe handling? And does not the bush suffer from such treatment? It is no uncertain claim that is preferred on behalf of Bogawantalawa—that it is well adapted for tea; and, given good factory accommodation and other aids to manufacture, its teas should be as flavoury as those of any other district of a like elevation. False economy in plucking and in manufacture is held responsible for disappointing prices on some places.

NOTES FROM OUR LONDON LETTER.

London, May 5, 1899.

The

KLANANG PRODUCE CO., LD.,

of which I sent a forecast last mail, issues its prospectus this week. The share capital is £20,000, divided into 20,000 one pound shares, and the present issue is £13,500, of which 7,500 fully paid-up shares will be issued to the vendor in satisfaction of the purchase price, and 7,800 shares at par are now offered for subscription payable 2/6 on application, 2/6 on allotment and the balance as required. Mr. F. H. Wiggin, of Ceylon and Woolstone, Cheltenham, is Chairman, and the three gentlemen mentioned last week, viz., Messrs. Ed. Walker, Jas. M. Caine and David K. Michie, of Ceylon, are directors; bankers, the National Bank of India; solicitors, Messrs. Murray, Hutchins, Stirling and Murray, 11, Birchin Lane, E.C.; Secretary, Mr. A. M. Currie; offices, 17, Philpott Lane, E.C. The Company is formed to take over, carry on and develope the Klanang and Beaumont estates in the Federated Malay States of Selangor. Klanang is planted with 206 acres of coconuts and Liberian coffee, five acres of cacao, 14 months old; four of coconuts alone, half being in bearing; and 4½ acres are to be planted with tea, for tea seed; while from 1,705 to 1,924½ acres remain at present, jungle reserve. On Beaumont there are 90 acres of Liberian coffee, two years old; 148 cleared and drained, but not yet planted, and 156½ to 394½ still in jungle. Coconuts grow well and are extremely productive in the Klanang district, and it is intended to pay special attention to that product, but coffee, rubber, ramie, etc., will all probably be included in the cultivation and development of the Company's estates. The two estates have been valued by Mr. E. V. Carey, who put the Klanang estate at 47,645 dollars, and the Beaumont property 11,008.50 dollars.

CEYLON TEA IN AMERICA.

REPORT FROM MR. R. E. PINEO.

It was neither my purpose nor intention, in a previous communication, to point out, or even suggest, improvements on past methods. My object was to awaken and concentrate interest in the arduous undertaking of making our tea better and more widely known to the general public of the United States.

The "Thirty Committee" has announced its purpose to continue the campaign in America, and has voted six thousand pounds for 1900, to further exploit and endeavour to gain greater recognition for our staple in the United States of America. It should be the study and aim of the "Thirty Committee" to solve this one knotty question, *i.e. how can the consumer be most quickly and effectually reached, and, when captured, permanently retained?* This query covers the whole ground, and embraces every feature connected with the crusade.

It now remains for me to make known how, in my opinion, the consumer is to be secured, and, of equal moment, thereafter *held!* This can only be accomplished by working *through* and *with* the *retailer*, who should be assisted, in every reasonable way, by the Commissioner. Help the retailer by advertising in the local papers and by demonstrations. The retailer will then have an incentive to doing good work, as he is the only proper medium between the wholesale dealer and the consumer, whose aid should be invoked.

Once you have succeeded with, and gained the energetic assistance of, the retailer, the result is certain to be satisfactory; the consumer will be secured, and the wholesale dealer will be forced to keep and provide the retailer with everything he wants.

The representative in America of the "Thirty Committee" should be constantly on the move and work systematically. For example, let him visit Boston and every town having a population of 10,000 and upwards in the New England States; then take up the Central, Western, Pacific, and Southern States in the order named.

In each city or town let him seek out a few of the most prominent, progressive retailers, obtain their co-operation, assist them in locally advertising, and show them how best they can make attractive, popular demonstrations.

Special, Local Advertising.—The representative should seek and act upon the advice of the retailer, and select such mediums as he—the retailer—may recommend. In some localities, more especially where the town may be the centre of a large agricultural district, the local weekly should be availed of, as every agriculturist uses tea, and reads everything—including advertisements—that appears in his weekly newspaper.

General Advertising.—Monthly magazines that are read by the masses like "Muncey's" and the "Cosmopolitan," can be occasionally, used to great advantage, and there are also a few of the weekly papers that could be profitably utilised.

Demonstrations.—One of the most successful and permanently profitable entertainments given by me was in connection with a bazaar held in aid of a large hospital, by the society ladies of Brooklyn, and what made it attractive and *remembered*, was the fact that about a dozen of the handsomest young women, daughters of society leaders, appeared in Tamil costume and served tea. The Bazaar was a huge financial success, and the costumes and tea formed the subject of many a chat long after the whole thing was closed.

Now the representative should be furnished with at least a dozen washable, rich Tamil costumes, including a goodly show of native jewellery—and when making demonstrations in a shop, should engage a couple of handsome coloured women to appear in this costume and serve visitors with tea. This would prove a drawing card, and, in the smaller cities, a powerful attraction. Where it was found a Church festival or a bazaar was in progress, the feature that made the Brooklyn affair so telling, might be introduced. It may be thought that anything done as herein mentioned, would be a slow, tedious operation, and take too long a time; but I maintain that it is the only method that will give lasting results at a minimum cost, seeing that the wholesale dealer cannot be relied upon to create a demand for an article that is not called for by the retailers, hence the latter's support must, in the first instance, be secured and his efforts assisted and fostered. The retailer is, therefore, the *one* person whose goodwill and aid should be sought, husbanded and promoted. Let the retailer work energetically, hopefully and successfully, and you have made a friend and coadjutor of the wholesale dealer or jobber. The method herein outlined may appear to some silly, childish and imperfect, and unworthy of consideration, but—frequently—simple, direct methods lead to the greatest successes.

Later on I may, perhaps, refer to Canada and Russia. R. E. Pineo.

MINOR PRODUCT REPORT.

Croton Seeds.—Offered 69 packages. Sold 0. All the offerings at the drug auctions today were bought in at from 50s to 70s.

Citronelle Oil.—Very quiet privately and quoted at the same figures. For today's auctions 2 drums were catalogued, but had been sold when reached.—*B. & C. Druggist*, April 28.

Cinchona.—At the London auctions on Tuesday only odd lots of low percentage bark found buyers at a decline of about 25 per cent to 30 per cent on last sales' rate, the unit value being 1¼d per lb, against 2½d at the previous sale.

Ceylon.—Lederiana, original stem chips. 8¾d; poor red orginal chips 2¼d and 3½d per lb for fair.

The bark sold to manufacturers on Tuesday represents 60,000 oz. or thereby of quinine sulphate. They were low quality barks. It will be noted that the firms who generally buy most largely were on this occasion small buyers, because they declined to pay the prices asked by the sellers for the higher quality barks. The sales scarcely form a criterion for the quinine speculator, and these matters must wait next week's auctions at Amsterdam. There the total quantity of quinine sulphate in the bark to be offered equals 19,450 kilos (680,750 oz). The manufacturing bark contains an average yield of 5·52 per cent, against 5·26 per cent in March, and 5·21 per cent for the ten auctions of 1898. How the sales will go is a knotty problem. The Java shipments last week were nil (so it is said). Meanwhile the arrivals in Amsterdam are large, no fewer than 1,410 packages having arrived by one vessel this week.

Lemon Oil.—There has been a large amount of business done during the past ten days, and as large orders are available, holders are this week slightly easier at 3s to 3s 9d, c.i.f., according to quality and brand.

Quinine.—The course of this article has again been downward, and fruitless attempts were made by speculations to bolster up the market on Friday and Saturday last, but on Monday the improvement was lost, small sales being made for August delivery at 1s 4d, and there were buyers for May delivery

at 1s 3½d per oz. On Tuesday, in consequence of the disappointing bark sales, the market remained inactive, with sellers at 1s 4d and buyers at 1s 3d for August delivery. Wednesday brought a further decline; a sale of 8,000 oz. of Zimmer's brand at 1s 1½d per oz. actually took place, and the two leading German brands, which have been the subject of so much speculation, dropped to 1s 2½d spot and 1s 3d August, but we heard of no sales at these figures, and by the afternoon prices had recovered by ½d there being no eager sellers. Today the market again is quiet.

SPICES have continued very dull all the week, and at the public sales on Wednesday there was little disposition to purchase. Zanzibar cloves steady, but quiet, at 3⅜d per lb for delivery. There were none offered at auction, but some good Ceylon, slightly mixed headless, sold at 3¾d to 4d, and dark mixed at 3½d per lb. Cinnanon sold at 5½d per lb for hard fifths, at 5½d for dull quillings, at 6½d for broken, and at 2¼d for common bark. All the Singapore and Penang Pepper in sale was bought in, but quotations remain the same as our last report. Long pepper partly sold at 38s per cwt, fine bold black Mangalore sold at 8¾d per lb, and Ceylon white at 8½ per lb.

ANNATTO SEED.—Good bright West Indian seed was limited at 2½d per lb, another lot sold at 1½d.

KOLA.—Boldish mouldy West Indian realised 2½d per lb, while fresh and good 6d was wanted. Small African quarters were bought in at 4d per lb. Privately retail sales of fresh West Indian have been made at 6d per lb.

CITRONELLA OIL.—Privately there have been retail sales in tins at 1s 0¼d to 1s 0½d per lb spot; drums are offered at 1s.

VANILLA.—At today's auctions only a moderate quantity offered, and chiefly sold at steady prices as follows:—Mauritius, good bold chocolate beans, 9 inch 32s; 8 to 8½ inch 26s 6d to 28s; 7½ to 8 inch 26s; 7 to 7½ inch, 24s 6d to 25s; 6 to 6½ inch 21s to 23s 6d; 5 to 6 inch 23s to 23s 6d per lb. Seychelles: 7½ to 8 inch 24s 6d; 6 to 7 inch, 24s; 6 to 6½ inch, 23s 6d; 5 to 6 inch, 19s. Tahiti were all bought in at 10s per lb.—*Chemist and Druggist*, April 29.

INDIAN TEA AND TEA SHARES.

Tea shares have been rather in the background during the week, says the Calcutta correspondent of the *Pioneer* writing on May 13, as there was considerable doubt of prices being maintained at the opening sale yesterday. There apparently was a want of pluck among buyers, resulting in a good many of the lots which were offered being withdrawn for shipment direct to London. I hear, too, that there was a tendency on buyers' part to divide the larger parcels, in this way preventing the competition which teas offered at auction are supposed to obtain. I am glad to hear that two firms at least among the brokers are determined to discourage amalgamation of this kind among the buyers. It is well known that this clubbing together to keep down prices exists to a great extent among the blenders and vendors of the ten-penny tea canisters in London; and, as Messrs. W. S. Cresswell & Co. remark in their tea report of yesterday, although "the position is an exceptionally strong one, unless tea is handled more judiciously than hitherto, we shall soon see prices collapse and fall back to their old level." Prices realised at yesterday's sales were in many cases 30 per cent higher than the opening sale of last season, but in spite of this there has been little movement in tea stocks today, and prices are lower all round than they were last Saturday.

OUVAH COFFEE COMPANY, LIMITED.

Report presented to the fourth ordinary general meeting of the Company held at No. 5, Dowgate Hill, London, on Tuesday, the 9th May, at noon.

The following accounts are now presented to shareholders, viz, :—

Balance sheet made up to 31st July 1898.

Profit and loss account for crop 1897-98.

The receipts from the sale of produce were as under:—

		£	s	d
Tea from the Company's own estates	708,500 lb.			
Tea made from bought leaf	106,247 ,,			
Total	814,747 ,,	26,421	2	10
Coffee 375 cwt. 0 qr. 23 lb.		1,842	2	2
Cocoa 185 cwt. 0 qr. 19 lb.		611	6	1
Cinchona 17,963 lb.		200	15	8
Sundry sales in Ceylon		64	17	11
Total receipts		£29,140	4	8

The total expenditure in Ceylon and London for the year amounted to £25,366 5s 1d, and deducting this from the value of the produce a profit is shewn in the year's working of £3,773 19s 7d, to which has to be added the balance of £396 7s 10d, brought forward from last year. After deducting income tax the total at credit of profit and loss is £3,909 4s 9d.

An interim dividend of 1½ per cent was paid on the capital of the Company on 23rd November 1898, which absorbed £1,500 of the above sum, and the Directors now recommend that £2,000 be applied to the payment of a final dividend of two per cent, making 3½ per cent for the year, and that the balance of £409 4s 9d be carried forward.

Owing to drought experienced during the latter months of the financial year the estimated crop of tea was not secured, the yield from the 1,618 acres in full and partial bearing being 438 lb. per acre against 475 lb. per acre in the previous year. The market also ruled very low, and our tea realized 7·78d per lb, against 8·08d for the preceding season.

The small coffee and cocoa crops sold at an average of 98s 2d and 66s 1d against 91s 1d and 55s 1d respectively, and the cinchona realized an average of 2·68d per lb.

The cost of tea planting and upkeep of 523 acres of young tea not in bearing is included in the year's expenditure, and a sum of £2,037 6s 0d spent on factory extension has been held up in the balance sheet.

The tea crop for 1898-99 is estimated at 750,000 lb. So far the season has not been favourable, and pluckings have been small, but with a return of favourable weather our Estate Manager considers that the estimate can yet be secured. It is highly satisfactory, however, that prices influenced by short shipments from Ceylon and by an increased home and foreign demand, have hardened considerably since the commencement of the year, and it is generally considered that we are not likely to see a return to the very low values current last year.

Coffee prospects are better for the coming year. The crop is estimated at 3,000 bushels, against 1,882 bushels secured last year, and if this is realized it will materially swell the year's profits.

Only 23 acres are being planted with tea this season, a small area in comparison with the plantings of recent years. This will considerably relieve expenditure and release profits for dividend purposes.

The acreage of the Company's property is now as follows:—

Tea, over 5 years old		1,545	acres
„ planted November-December	1894	153	„
„ „	1895	159	„
„ „	1896	151	„
„ „	1897	133	„
„ „	1898	23	„
Area under tea		2,164	„
Area under coffee and cocoa		442	„
Area under fuel		367	„
Forest patna and waste		515	„
Total area		3,488	acres

The Directors regret to report the death of their esteemed colleague, Mr. Norman Stewart. They have filled up this vacancy on the Board by the appointment of Mr. J. G. Wardrop, who retires from office on this occasion, and, being eligible, offers himself for re-election.

PRODUCE AND PLANTING.

TEA AND COFFEE IN AMERICA.—The New York correspondent of the "Grocer," in calling attention to the consumption of coffee and tea in the United States, gives a table comparing the percapita consumption of the two products in beverage form in 893 and 1898, which is as follows:—

	1893.	1898.
Coffee	14.00	19.46
Tea	8.00	5.46

From this it will be seen that the consumption of coffee has greatly increased, while that of tea does not grow. He says; "Probably the coffee returns are too high, as all deliveries from licensed warehouses are counted as consumption, whereas the quantity held in unlicensed warehouses is much larger than was customary in 1893, when the import cost was 7d, against 3¾d in 1898. The tea figures are also misleading, as the withdrawals were unusually heavy in 1897 owing to heavy imports to escape the tax. Making allowance for these facts it appears, unmistakeably, that the use of coffee has largely increased. The reason is not hard to find, as coffee is retailed at 5d per lb. up to 1s 6d. A pound of coffee at 5d makes two gallons of beverage, while one pound of tea paying 5d duty, and selling at 2s per lb. at retail, makes six gallons of beverage costing about 4d per gallon, or 1½d more than coffee. It is claimed that one pound of Ceylon and Indian tea will make sixteen gallons of beverage, which statement we will not dispute; but Americans will not learn to properly brew British-grown tea, insisting on using as large a quantity as they have been accustomed to of China or Japan sorts, and hence they do not take kindly to the heavier body and sweetish flavour of Ceylon and India. The preference is decidedly for a blend, and in this way there is a constantly enlarging demand for Ceylon and Indian tea. But the Americans are partially fond of coffee, and last year imported 851,691,084 lb., or nearly double the imports in 1880, '81, '82. The imports of tea average about 95,000,000 lb. for the last five years, while in 1880, '81, '82 they averaged over 75,000,000 lb.

GROUNDLESS ALARM.—Clearly there were some apprehensions on the subject of the Budget and the tea duty. Between the end of March and April 13th no less than 14,860,778 lb. were taken out of bond mainly as a precaution against any possible increase in the duty. This is 9,076,368 lb. more than was taken out during the same period in the previous year.—*H. & C. Mail*, May 5.

THE INDIAN TEA ASSOCIATION.

The opinion of the Assam Branch Association that it would be injudicious to discontinue our efforts in America, came too late to be of any use says *The Planter*. Mr. Buckingham's memo. expressing his opinion that the Assam Branch should strengthen the hands of the General Committee by protesting in the strongest terms against the discontinuance of the work in America, was confirmed by a subsequent letter, dated 20th April, recording that the Committee of the Assam Branch concurred in the opinions expressed in the memorandum. Unfortunately, Mr. Buckingham had to be informed that it was not open to the General Committee to take any further action in the matter, as it had been decided at a meeting of the London Committee held on 31st January, without reference to India, that operations in America should be discontinued. In his letter of 3rd February, Mr. Tye, the Secretary of the Association in London, had stated that the Committee were unanimously of opinion that the time had arrived for discontinuing the work, and had accordingly instructed Mr. Blechynden to bring his mission to a termination. Mr. Tye further stated that Mr. Mackenzie, the representative of Ceylon in the United States, had also informed his Committee that the work in America could well be brought to a speedy terminatian. So, for good or ill, the matter is settled, and those interested in tea can only sit and wait the result of the action of the London Association, which has practically been universally condemned in India and Ceylon.

We have some news at last of what is being done with reference to the Paris Exhibition. The London Committee has made arrangements with Mr. E F Langdale to sell Indian tea at the Paris Exhibition on the understanding that the Association should not be responsible for any outlay beyond the sum of £1,000 agreed to be paid to the Royal Commissioners for the space which had been allotted for the representation of Indian tea. Mr. Langdale was well known in connection with work of a similar description, as he had been associated with the Health Exhibition held in London in 1884 in a like capacity. It was understood that in the arrangements to be made Mr. Langdale would follow the lines observed by him at the latter Exhibition, which gave general satisfaction. Mr. Langdale would arrange for the service of Indian tea in the cup, and would make special efforts to render the Court in which it would be served attractive to visitors. So, apparently, beyond being responsible for £1,000 which is to be paid for space, the Tea Association washes its hands of the Exhibition, and leaves the interests of Indian tea entirely in the hands of a private individual, who, most naturally, has his own interests to think of first. However, these interests *may* possible coincide. The London Committee has had under consideration the question of the lines upon which a new Levy should be conducted for opening out new markets other than the American, for the sale of Indian tea. Favourable replies had been received from a few concerns in London to the circular issued by them on the 24th February, in which subscriptions were invited, but it was noted by the General Committee that it was not stated specifically upon what lines the new Levy was to be raised. The reply received to the former telegram sent not making the matter any clearer, it was decided to wire the London Committee again asking for full details of the new scheme for opening out new foreign markets,

as no satisfactory appeal for funds can be made without some knowledge of the programme proposed, and speedy action is essential to success. A remark to this effect was to be included in the telegram to be sent to the Committee of the Association in London.

Another letter from the London Committee in connection with the American Market, was dealt with. Mr. Mackenzie, the Ceylon Commissioner, had recommended the Ceylon Committee of Thirty to continue the work in America for two or three months only in 1,900. The decision of the Ceylon Committee had not, however, been so far received. The General Committee also understood that the balance remaining of the amount raised by the last levy, after the close of Mr. Blechynden's Mission, would be devoted to the continuance of the advertisement issued jointly by the representatives of India and Ceylon teas.

CROSSING OUR TEAS.

WHAT LONDON TEA MERCHANTS ARE CONCERNED ABOUT.

(*Daily Mail Special.*)

The statement made at the meeting of the Whitechapel guardians, and reported in our yesterday's issue, that there was an unexpected rise in the price of tea, was confirmed yesterday in the inquiries instituted by a *Daily Mail* representative.

What the London tea merchants are most concerned about, however, are the bold attempts of foreigners to foist cheap unwholesome teas on the London market.

"The Custom House authorities," said Messrs. Alfred Newby and Co., of Mincing-lane, to a *Daily Mail* representative yesterday, "ought to stop the importation of this foreign stuff at once. It is injurious to the public health, and should never be allowed to come into our market. Here is a sample of tea which we had sent to us from Belgium, the price quoted being 6½d per lb without duty. It is of too long growth, it has been infested with caterpillars, it has a most disagreeable odour, and it would be

A SOURCE OF DANGER

to the public health if it were consumed. It is Oolong tea, and is probably part of a consignment which was rejected by the Belgium people as worthless.

"And now attempts are being made with a a view to putting it on the English markets. If something is not done to check its importation other countries besides Belgium will try to find a market here for the tea which is no good to them.

"This state of affairs arises from the fact that Indian, Ceylon, and China tea has been overbought by the blenders. There was a rumour about Christmas time that the supplies would be short, and since then prices have been gradually rising. Those blenders who foresaw the position bought as much tea as they could while the prices were normal, in order to carry themselves over the season, and, of course, they have made huge profits, one firm, we hear, having made as much as £20,000."

THE NUWARA ELIYA ESTATES COMPANY.

As Mr. A. F. Souter has appealed to us in connection with his criticism of this Company's affairs, we can bear testimony, from personal knowledge, to the adequacy of the explanation tendered in the Directors' Report, of the falling-off of profit from Naseby estate during 1898. With the Factory under reconstruction and enlargement for the greater part of the year, we have been assured by the superintendent—Mr. Battinson—who has just gone on leave, that it was impossible for him to keep up the same careful preparation of the tea,—to secure adequate withering and to do justice in other ways. All that is now at an end, and the Factory, one of the roomiest and best equipped of its kind, in the hill-country, has been in full working order during the present year.

As regards the local management of the Company's affairs generally, we can assure Mr. Souter that, in our opinion, more hard-working, conscientious Manager and Superintendents—from all we have seen and heard—no Tea Company connected with Ceylon can show; while as to the Agents, it is superfluous to say one word. We have great confidence in the future of the Company and in its good management both in Ceylon and London.

CINCHONA IN CEYLON.

It was to be expected that the advance in the price of cinchona bark and the promise of a further rise in the future would set planters in India and Ceylon wondering whether it was worth while to go into the cultivaition of cinchona trees again, or to extend their existing plantations. It appears that in Ceylon operations have actually been begun in this direction, and the *Tropical Agriculturist* prints an interesting letter which it has received as the result of advising the importation of fresh seed from India or Java for the purpose of trying cinchona again in the Ceylon hill district.—*British and Colonial Druggist*, May 5.

CINCHONA IN JAVA.

The unknown quantity to quinine speculators is the condition of the cinchona industry in Java, and whether it pays the planter or not to produce. "Why shouldn't it pay?" asked a sapient person in the Commercial Sale-rooms the other day. "Oak bark sells at £5 a ton, and pays." "Because it is a by-product," added a long-headed broker. "They cut down the oak trees for the sake of the wood." In Java they grow cinchona for the sake of the bark. We have before us a report regarding the plantations there, which gives the latest available information, and from this we learn that the Government has decided on principle to give up the cultivation of cinchona, and transform the plantations into experimental gardens. This will be done gradually, no seedlings being planted in place of the up-rooted trees. The Government plantations are eight in number and to the three of these plantation nurseries are attached for the propagation of seedlings and grafting. The number of trees in the plantations diminished in 1897 by eleven per cent, and, as the reduction will go on at about this rate yearly, it will be eight years at least before the Government ceases to be competing factor. They are eighty-three private plantations in Java, of which fifty-eight are situated in the Praenger province. These show no indication of reduction. The Bandoeng quinine-factory is now able to produce quinine to the extent of 3,500 oz per day, or 2,500,000 oz a year, and the Pandang Aroem works are gradually pulling up. So that there is no intention of stopping Java quinine. Thirty-four cases of the Bandoeng brand were landed at Amsterdam this week.—*Chemist and Druggist*, April 29.

PANAMA RUBBER.

In a report just issued by Mr. Willis, Director of the Royal Botanic Gardens, on Panama rubber (Castilloa) it is stated that the question of which rubber tree to plant with the most favourable prospects of a profitable return has been considerably altered by the discovery of a machine on the principle of the centrifugal cream separator, by which Mr. Biffen has succeeded in preparing almost pure caoutchouc from any which (*latex*) which contains it. The question milk tree gives the greatest yield of caoutchouc has still to be answered; but, Mr. Willis says, there is great probability if not almost certainty that it must ultimately be answered in favour of Castilloa. Private planters, he thinks, will hardly find it worth while to establish plantations of Para rubber only. Probably the best thing to do would be to plant out the tree among the tea or other products at considerable distances apart. The trees would then grow to a large size in less time than if kept in plantations of rubber only, and their rubber would form a useful minor product. Those who intended to make plantations of rubber only would do better to use castilloa which yields much more fluid and easily collected milk, but even here no return can be got in much less than eight years. This tree may also be planted out as a bye-product on estates and will probably be found in the end the more favourable of the two. Ceylon seems an unfavourable country for yield though highly favourable for growth of rubber trees.

CEYLON TEA IN AMERICA.

Mr. MacCombie Murray sends us a chatty letter from Philadelphia about his early experiences in "tea"; and he adds correspondence which has appeared in the New York press and which reached us before; but which, now given consecutively, has a special interest, more especially with the addition of our correspondent's notes.

But the curious fact to us is that neither Mr. Martindale, Mr. Murray nor any of the other writers in this Tea discussion stumbled on the proper answer to the objection raised, that while Ceylon and Indian teas might do very well for the rainy, damp climate of England, they were unsuitable for the dry, electrical climate of the American States. The objection is that our teas have too much tannin for the latter condition. Now, apart from the fact that the proportion of tannin drawn off into cups of tea can be regulated by the time given to the infusion —what do Messrs. Martindale, Robertson, and others of our American cousins say to the case of Australia, with its far drier and more electrical climate than any to be found in the States? Here are the Australians—a nation of athletes, beating the English at their favourite game of cricket—drinking tea (mainly Ceylon and Indian) at the rate of 7 lb. per head per annum! Where are the bad effects? Does their experience not prove that tea is just the beverage for the people of the United States from New York to San Francisco, New Orleans to Chicago and Philadelphia to Denver? If our American cousins only took to tea, up to 2 lb. per head per annum, they would benefit themselves and tea growers everywhere!

PANAMA RUBBER (CASTILLOA).

(Royal Botanic Gardens Circular: issued by Mr. Willis, Director.

In Circular No. 4 of this Series the cultivation of Para rubber was dealt with somewhat fully. It was pointed out that there is not very much suitable land in the Colony on which this cultivation was likely to prove really successful. The growth, cultivation, and yield of trees were considered, and a prospect of a moderately remunerative return in favourable places for the cultivation was shown to exist. Since the time of publication of these statements, however, the question of which rubber tree to plant with the most favourable prospects of profitable return has been considerably altered by the publication of the discovery of a machine for the preparation of rubber from the raw milk of the tree. By the aid of a machine on the principle of the centrifugal cream separator, Mr. Biffen has succeeded in preparing almost pure caoutchouc from any milk (*latex*) which contains it. This is done in a few minutes at a very small cost, and the resulting product is almost free from impurity, and does not decay or smell like the ordinarily-prepared raw rubber. The best rubber hitherto sent into the market contains at least 10 per cent. of impurity, and many kinds contain as much as 30 to 40 per cent. The importance of this discovery is manifest. The chief advantage of Para and Panama rubbers, as at present prepared, is their great freedom from impurity, due largely to the composition of the milks, and partly to the methods of preparation. Under the new conditions, however, this advantage is lost, for the machine will prepare from the poorest and most impure milk a rubber superior to the best Para now on the market. The first question therefore before the would-be grower of rubber trees is now no longer. "Which tree gives the best result as to quantity and quality combined?" but rather, "Which tree gives the greatest yield of caoutchouc?" The former question had been practically answered for Ceylon in favour of the Para rubber (*Hevea brasiliensis*). The latter has still to be answered, but there is great probability, if not almost certainly, that it must ultimately be answered in favour of *Castilloa*, and hence the publication of this Circular in which it is proposed to deal with the whole question so far as present existing data allow of conclusions. The tree has been so little cultivated in the East that reliable data in sufficient numbers are not to be had, and it is hoped that the publication of this paper will induce those who may have experimented with this tree to communicate the results of their work.

Another important bearing of the discovery abovementioned must also be pointed out. At present the best natural rubbers obtain about 4s per lb. in the London market. When the machine-prepared article first comes upon the market it will doubtless obtain a higher price than this, but this will not long be the case. Inevitably the price of the best machine rubber will fall to about that of the best natural of today, while the latter will only fetch perhaps 3s per lb., and the poorer grades will also fall in price correspondingly. For profitable cultivation, that is, the machine methods must be used. Now, for this purpose it is necessary that the milk be collected in vessels and not allowed to dry on the tree. We have seen in dealing with Para rubber that in Ceylon, at any rate, the milk is very thick, almost like syrup. It quickly coagulates, and in all cases a lot of it dries on the tree. Before the recent discovery this mattered less, for this scrap rubber would sell for 1s 6d to 2s 6d per lb. Now, however, as we have just seen, this price is likely to fall by 1s or more. This will materially alter the figures of return given in the last paragraph of the circular referred to. Instead of the average price being 2s per lb it is more likely to be 1s 6d, and this will reduce the yield per acre to R112 say. This reduces the margin of R100 there given to R62, leaving considerable uncertainty as to whether the cultivation is likely to pay at all well enough to be worth attention from European planters, who would prob

ably find the trees yield much better in the Straits or America. *Castilloa* milk flows very much more freely and does not soon coagulate, so that the same objection does not apply to it. Practically the whole of the milk from a tree can be collected without any difficulty from coagulation beginning in it.

The practical corollary of these remarks, so far as Ceylon is concerned, is this. Para rubber will do fairly well at low elevations in certain districts, though probably at the best it will never do so well as in the Straits Settlements or America. Owing to the introduction of the machine methods it will in future be necessary to collect the milk in vessels. Now, the Para rubber tree when tapped at a girth of 2 feet, as recommended in the previous Circular, does not lend itself to this condition, much of the rubber dries on the tree. It will thus be necessary for planters either to content themselves with the old process, thus getting a lower average price for their product, or to wait till the trees get to a larger size, say in fifteen years on the average. It follows from this that private planters here will hardly find it worth while to establish plantations of Para rubber only. Probably the best thing to do will be to plant out the tree among tea or other products at considerable distances apart. The trees will then grow to a large size in less time than if kept in plantations of rubber only, and their rubber will form a useful minor product. The tree is a handsome tree when well grown apart from others, and might well be used as shade for roads or as an ornamental tree.

Those who intend to make plantations of rubber only would do better to use *Castilloa*, which yields much more fluid and easily collected milk, but even here no return can be got in much less than eight years. This tree may also be planted out as a bye product on estates, and will probably be found in the end the more profitable of the two. Ceylon seems an unfavourable country for yield, though highly favourable for growth, of rubber trees. Consequently, only the very best localities should be chosen for planting.

BOTANY.—*Castilloa* is a genus of the family *Moraceæ* (often included in *Urticaceæ*), and belongs to that section of the family which includes the jak and breadfruit (*Artocarpus*), the upas (*Antiaris*), the milk tree (*Brosimum*), and the many plants of the genus *Ficus*, which include among others the Bo and the Assam rubber (*F. elastica*). The genus has two or three species. Of these the most important is *C. elastica*, Cervantes, the Ulé of the Spaniards, which is found wild in Mexico from lat. 21° southwards, in Guatemala, Honduras, San Salvador, Costa Rica, and Nicaragua: it also appears to occur in north western South America. It grows to a large tree having been measured of 180 feet in height and 15 feet in girth. The growth is rapid. When young the tree grows rapidly upwards, and forms a number of short lateral branches, which after a time drop off, being detached from the trunk by a peculiar joint, whose surface resembles a piece of coral. The bark is rather soft and thick. The leaves are large and oblong. The flowers are borne when the tree has reached some considerable size and has begun to form permanent branches. They are monœcious, male and female on the same branch, enclosed or embedded in a top-like common receptable, which is covered externally with small leaves. This subsequently forms a somewhat fleshy fruit, containing numerous small seeds about ½ inch in diameter, with white papery seed-coats. Besides this species there is a second, the Caucho of the Spaniards, found near Darien (Panama) and elsewhere. This is the tree which we have in Ceylon, and it appears probable that it is a different species, *C. Markhamiana*, Markham (not Collins), but the point requires further study. In its native country this forms an important source of rubber. It appears to be a smaller tree than the true *C. elastica*. The details of the description of these species may be found in the paper by Hooker mentioned in the list of literature below.

HISTORY IN CEYLON.—The *Castilloa* rubber was introduced into the colony about the same time as the Para, and through the same agency. A Wardian case of plants arrived in 1876 from the Royal Gardens, Kew, and the plants were put out at Henaratgoda and Peradeniya. They grew well at both places, but especially at Henaratgoda, and were increased by cuttings. They began to flower in 1881, and in the following year a few seeds were ripened. About 1886 the growth became less rapid, and since then has been very slight, the soil in the gardens being shallow, and at Henaratgoda not well drained at a little depth. A large number of young plants were sent to India and many were planted in Ceylon, but, compared with Ceara and Para rubbers, *Castilloa* is very rare in the Colony, and very few estates possess any appreciable number of trees. Samples of rubber prepared here have been sent home for valuation, and have received very favourable reports.

CLIMATE AND SOIL.—The tree ranges, as we have seen, over a large tract of country, but the conditions for its successful growth seem much the same everywhere. It inhabits a warm, steamy climate, like that of the lowcountry of south-west Ceylon, and is very rarely found above 1,500 feet. The most common situations are in alluvial soil at the sides of valleys or on low ridges. It needs deep soil, with plenty of water, but does not thrive where the soil is swampy, nor in places where there is not good drainage at the roots. It is probably partly for this reason that the growth at Henaratgoda so soon became slow, for the land there is flat and only twenty feet above the level of the sea. At Peradenya it is on better drained land, but the soil is very shallow.

The tree prefers a steamy climate, but will do where this is interrupted by a dry season of two or three months, as in south-west Ceylon. It grows best where the temperature never falls below sixty degrees at any time.

The most promising localities for the cultivation of this tree would probably be found in the neighbourhood of Rambukkana, Kitulgala, Balangoda, and other districts in the foot hills of the south-west, and perhaps also in similar districts of the Bintenna country to the east of the mountain range, and in lower Madulsima, Passara, Monaragalla &c. It should be planted in sheltered places near streams, but with good drainage at the root. To plant above 2,000 feet is not advisable, and it would be better to plant below 1,000. The rainfall should not be below seventy inches, and should be well distributed. The tree affects drier localities on the whole than Para rubber, and so the two cultivations need not interfere with one another, as the Para tree will grow in the wetter places.

The tree grows best in a deep, warm, loamy soil. In its native country it is said to send its roots very deeply into the soil, and not to be a surface feeeder. In the gardens at Henaratgoda, however, it sends out great roots at the base like the Assam rubber (*Ficus elastica*), growing out to considerable distances along the surface and projecting above it. One root was measured running along the surface for 30 yards, and where it finally became invisible it was three inches in thickness. This phenomenon at Henaratgoda may be largely due to the quality or lack of drainage of the lower soil, but it seems common in other places where the tree is grown in the Colony, and will limit its use as a shade tree, for which purpose it has often been recommended in other countries. If used as shade, it would perhaps do better with tea than with most of our other cultivated crops. In better soil and position than what has hitherto been tried, however, it may very likely strike deep roots, in which case other crops could be more easily cultivated between the rubber trees, *e.g.*, plantains or even cacao.

CULTIVATION.—The seed should be sown as soon as obtained in a well-prepared nursery. They should be sown an inch deep, and about 8 inches apart, and lightly covered with a little vegetable mould. They must be kept lightly shaded, and watered when the surface of the ground is dry. In ten or twelve months the young plants will be 2 feet high and ready for planting out.

Cuttings may also be taken; those from lateral branches do not grow well, and have a tendency to

grow more or less horizontally, so that main shoots must be used. When cut back the main stem produces buds from the axils of the leaves, and these may in turn be used as cuttings, and so on. Cuttings should be at least 3 inches long, with a basal portion of old wood, and perhaps 12 inches is better, as described for the case of Para rubber.

The young plants should be planted out during rainy weather in prepared places. Holes should be dug and filled with well-prepared sandy, loamy soil. If the plantation is to consist of trees of *Castilloa* only, they may be put at about 12 feet apart, or perhaps better a little closer. If other products are to be cultivated between the rubber trees, the distance must be much greater. The young trees must be shaded for a time, and probably it would be best if they were lightly shaded for two or three years till they reached a height of 20 feet or so. This might be effected by planting them, for instance, on land already bearing such light shade trees as are used for cacao. On parts of estates where the canker has rendered it needful to cut out the cacao it might be well worth while to try the *Castilloa*. The ground should be kept clear of weeds and the trees watered in dry weather of long duration, until they reach sufficient size to take care of themselves.

Rate of Growth.—The tree grows fairly rapidly at first, and soon reaches a height of 10 or more feet. From the annual Administration Reports of this Department the following extracts have been made with reference to this subject. In 1878 the original trees were two years old, from time of planting out as cuttings; some were 16 feet high, and 16 inches round the base of the trunk. In 1880 the largest tree at Henaratgoda was 17 inches in girth at a yard above the soil. In 1882 the largest tree there was 46 feet high, and 26 inches round at a yard above the soil. In 1884 its girth was 32½ inches; in 1886, 38 inches; and it began to show signs of less rapid growth, so that it only reached 40¼ inches in 1888, 42½ in 1890, and 43¼ in 1892. Up to about the tenth year, therefore, at any rate, the tree may apparently be counted upon to grow well; and even though the subsequent growth is slow, the yield of rubber seems to increase considerably. After reaching a girth of about 2 feet or 2 feet 6 inches the trees may probably be tapped for milk. Comparing the above measurements with those given in the circular on Para Rubber, it will be seen that *Castilloa* is distinctly slower in growth of the two and probably a plantation of Para rubber would reach the girth of 2 feet (average) in two years' less time than one of *Castilloa*.

Tapping.—The tree should not be tapped till it reaches a girth of at least 2 feet. This should be attained in a period of perhaps nine years on the average, and it would be better to wait for two years more if possible till a girth of perhaps 2 ft 6 in is reached After the eighth year there would probably be a fair number of trees in the plantation ready for tapping, and of course the number would increase every year till all were sufficiently large for the purpose.

The milk of this tree flows much more freely than that of *Hevea*, so that one cut seems to drain a much larger area of the stem of its milk. The native methods of tapping are mostly very wasteful, and also often cause the death of the trees. Sometimes the method described under Para rubber, by cutting V incisions at frequent intervals, is used, and so far this seems to have been the only one used in Ceylon. We have found that the milk here runs so freely a that simple sloping cut is sufficient, and that there is no need to make the V. If this method is used the cuts need not be so close together as in *Hevea*; they may be 3 or 4 feet apart instead of 1. Sometimes the whole tree is cut down and incisions made in the bark as it lies on the ground. Other methods are to cut spiral groves round the tree for some distance up, or to make a main channel on one side of the stem with lateral cuts leading into it. These methods are almost sure to kill the tree, at any rate after a few years, and only the first-mentioned, the mothod of simple incisions, should be used with cultivated trees.

Further details of methods will be given in succeeding Circulars of this Series. The general principle recommended is to attach four or five tin cups at distances of a few feet apart up the tree. Single oblique incisions are made, one above each cup, and the milk is collected and washed into a vessel with a tap at the bottom. Probably the best machine would be a glass churn with tap at base, fixed so as to revolve about a horizontal axis. The milk is left to stand, when it separates into a cream containing all the rubber, and a beery, fluid below, which is run off by the tap. The cream is mixed with water, churned, left to stand, and the process repeated. The rubber is thus obtained almost pure in three washings, and the cream is poured out to dry on a porous surface, when a thin sheet of perfectly dry and almost pure caoutchouc is obtained in a short time.

Yield.—Till further experience has been gained we do not know how much tapping is advisable in *Castilloa*, nor how much it will stand. The trees in the Island, so far as tested, yield very well, but it would be premature to draw any general conclusions. A few trees of about three feet girth gave an average of 5 ounces of rubber each from one day's tapping. Probably three or four tappings might be done every year without serious injury, but this remains to be investigated. The amount of rubber is not much larger than in Para trees of similar age, but it was collected from a quarter of the number of incisions, thus very much reducing the cost of its collection. It must also be remembered that this rubber was perfectly dry, whereas the driest rubber prepared by the old methods contained 10 per cent. or more of water.

The cost of opening plantations of rubber will be found in the preceding Circular. The probable return in the case of *Castilloa* is larger than in the case of Para, and its cost of collection is less, so that the cultivation of this plant as a bye product in favourable localities may be recommended to planters. Neither kind of rubber can be safely recommended as a principal product. Those who wish to plant it on a large scale would probably do better in countries further east.

Literature.—The following books and papers, among others, relating to *Castilloa*, may be consulted in the Library at Peradeniya. The initials and figures indicate their place in the Library:—

Hooker, Sir J. D., and Dyer, W. T. T., on the *Castilloa elastica* of Cervantes, and some allied rubber-yielding plants, Trans. Linn. Soc. Series II., Vol. II., p. 209, 1885 .. .. .. G 1

Morris, D., Cantor Lectures on the Plants yielding commercial Indiarubber, 1898 .. M 6

Morris, D., The Colony of British Honduras, pp. 74, 80 .. .. .. P 6

Seeligmann, G., Lamy, and Falconnet, Le Caoutchouc et la Guttapercha, Paris, 1896 .. .. M 6

Foreign and Colonial Office Reports: F. O. Misc., 1894, No. 322 (Colombia); Do 1895, No. 385 (Mexico) .. F 4

Kew Bulletin of Miscellaneous Information, December, 1887 .. .. J 3

Trinidad Bulletin, August 1898, p. 115 .. B 3

Tropical Agriculturist: Feb. 1883, p. 682; November 1884. p 301; March 1885, p. 697, &c. .. .. .. I 1

John C. Willis,
Director, Royal Botanic Gardens.

Peradeniya, April 7th, 1899.

The Para Rubber Trees are described as doing splendidly in the Kalutara district and there ought to be a fine show all over the place in a few years.

COOLGARDIE EXHIBITION AND CEYLON TEA IN AUSTRALIA.

We publish elsewhere a chatty letter from M. Joubert, the General Manager of the Westralian Exhibition. The testimony he bears to the success of the Ceylon Tea Court will be gratifying to the "Thirty Committee" and to planters and merchants generally. We leave the further portion of the letter to speak for itself: we might have sent it on to the "Thirty Committee," but saw no hope of any practical result in that quarter, because M. Joubert must understand that a tea trade between Ceylon and the several Australian Colonies has already been established,—that from a beginning of a few thousand lb. in 1881—the year of the Melbourne Exhibition—we have now got to shipping 13 to 15 million lb. to Australasia. There is, of course, plenty of room for expansion still, seeing that Australasia is credited with requiring altogether 28½ million lb. (*vide* Estimates in our "Handbook and Directory"); but the development of the Ceylon trade is now left entirely to our mercantile agencies, save in so far as the Tea Cess Fund (our tea planters' money) may help to establish a Tea Court at any local Exhibition, as has been done at Coolgardie.

Nevertheless, M. Joubert's wide family and business connection surely offers a tempting opportunity for establishing a successful Australian agency in Ceylon tea and we have, therefore, the more readily, given publicity to his letter on the chance of a Colombo tea exporting house without an Australian Agent, putting itself into communication with our correspondent. To forward the realization of his present wishes is to promote the interests of Ceylon tea; and we, therefore, trust that M. Joubert may be successful in hearing from a Colombo merchant, or proprietary planter, how a business may be established to cover the wide extent of colonies indicated in his letter.

FREIGHT AND COMMISSION CHARGES ON TEA PURCHASED IN CALCUTTA.

We (*The Indian Planters' Gazette*) enclose three *pro forma* documents:—viz.

(1) Shipper's Invoice;
(2) London account sale;
(3) Relative account-current;

which purport to deal with parcels of 100 chests of tea purchased in Calcutta at 5½ annas per pound, shipped at freight £2-10s per ton, and covered at exchange 1s 4d; buying and selling commission at 1½ per cent. These, it will be noted, are the exact factors upon which our tables were based. The account sale shows the sale of this tea in London at 7¼d, the equivalent shown in our table against a cost of 5½ annas, and the account-current discloses a difference of £1·12s or about ¾ per cent. over the whole transaction—a point that is unappreciable when it is borne in mind 8,000 lb. of tea is dealt with. The charges shown in these examples are actuals.

PLANTERS' STORES & AGENCY CO., LTD,
Calcutta, 10th May, 1899.

SHIPPER'S INVOICE.

No.

TELEGRAPHIC CYPHER.

Invoice of 100 packages of tea marked and numbered as per margin, shipped by the Planters' Stores and Agency Co., Ltd., Calcutta, per steamer "City of Perth" for London for account and risk of the concerned and consigned to order. Freight at 50s.

Draft at 3 months sight through National Bank of India, Limited, for £203-13-1 at Ex. 1s 4d.

				R	As.	P.
No. 1/100, 100 chests pekoe Souchong ..	8,500 lb. 5/6			2,921	14	0
CHARGES.	R	As.	P.			
Brokerage at 1 per cent ..	29	3	6			
Taking delivery, Marking and Shipping at 5 per chest ..	31	4	0			
Insurance on £220 at ⅜ per cent less 10 per cent at Ex. 1s 4d ..	11	2	0			
Policy Stamp ..	0	6	0			
Stamp Bill of Landing & Bill of Exchange ..	2	0	0			
Postage, Petties and Telegrams ..	10	0	0			
Bill Brokerage at ⅛ per ct.	3	13	0			
Commission at 1½ per cent.	45	2	3			
				132	14	9
				R3,054	12	9

E. & O. E.

Calcutta, 10th September, 1895.

ACCOUNT SALE.

Account sales of 100 packages of tea ex "City of Perth" at Calcutta sold by Messrs. Jones & Co on account of the concerned.

	Nett lb.			£	s.	d.
100 chests Pekoe Souchong ..	8,500					
Less draft ..	100					
	8,400					
Less loss in weight, say ½ lb. per chest ...	50					
	8,350 at 7¼d			252	4	1
LONDON CHARGES.	£	s.	d.	£	s.	d.
Freight on 100 chests at 50s per 50 c. ft. say 10 tons ..	25	0	0			
Interest on ditto 108 days ..	0	7	4			
Warehouse charges average 3s 4d per £ ...	16	13	4			
Interest on ditto 90 days ..	0	4	1			
Customs Weight Notes and Warrants ..	0	12	6			
Public sale expenses ..	0	12	6			
Brokerage at 1 per cent ...	2	10	5			
				46	0	2
				£206	4	8

RELATIVE ACCOUNT CURRENT.

THE CONCERNED IN ACCOUNT WITH THE PLANTERS' STORES AND AGENCY CO., LTD.

Calcutta.

	£	s.	d.
To Cash—Bill due	203	13	1
To Stamping Marine Policy Fire Insurance, London ..	0	8	0
To Selling Commission in London at 1½ per cent	3	15	7
Total ..	£207	16	8

LONDON.

		£	s.	d.
By Proceeds of sale as per account				
Sales shown ...	..	206	4	8
By Balance ..	..	1	12	0
Total	..	£207	16	8

E. & O. E.

London, 10th November 1895.

MINOR PRODUCTS REPORT.

LONDON, May 4.

CINCHONA BARK has dropped twenty-five per cent today in Amsterdam. Quinine, which has been the victim of the conflicting reports of Java bark shipments this week, has been, on the whole very quiet.

COCA LEAVES.—Quiet. Huanuco kind is neglected at 1s. For Truxillo there are inquiries, and business is likely to be done at 10d. The string of Ceylon leaves offered at the last auction have all been sold, 10d being obtained for all but the dark damaged leaves.

CINNAMON.—Quills are about half-pence better this week in anticipation of the small sale at the end of the month. Firsts are quoted 10d to 10½d; seconds, 9¼d to 9¾d; thirds, 8¾d to 9d; and fourths, 8½d. In the spice sales yesterday 13 bales of Ceylon were sold without reserve at 6¼d to 6⅜d; while 25 bags of chips were bought in at 3½d. During the three months—January, February and March 1899—331,217 lb of quills and 563,345 lb of chips were exported from Ceylon.

CINCHONA BARK.—From details of the exports of this article from Ceylon which have been published it appears that of the 150,080 lb of bark exported, from January 1st to March 28th 121,250 lb went to the United Kingdom, 28,797 lb to America and 33 lb to France.

FIXED OILS.—Coconut: Ceylon, spot, £25 10s to £25 15s.—*British and Colonial Druggist*, May 6.

CINCHONA.—The Ceylon shipments from January 1st to April 11th were 168,770 lb, as compared with 201,273 for the corresponding period of 1898. Since the auctions last week sales of 400 to 500 bales are reported, at an advance of ⅛d on the unit then paid. There have been nibbles for the soft Colombian bark, but no business has transpired. The exports of bark from Java for April were 996,000 Amst. lb against 850,000 last year, making a total for the four months of 3,021,800, against 3,225,000 Amst. lb last year. The shipments this year have been :—January 5098,00; February 539,000; and March 977,000 Amst. lb.

CARDAMOMS.—A fair amount of business is passing in Mysores privately at the rates paid in auction.—*Chemist and Druggist*, May 6.

INDIAN AND CEYLON TEA.

CIRCULAR TO ALL PRODUCERS AND IMPORTERS OF TEA.

The following circular has been issued by the Secretaries of the Indian Tea Association (London), and the Ceylon Association in London :—

We are instructed to forward to you the enclosed memorandum on the proposal to abolish the draft allowance on teas sold at public auction in London, and to invite your support. We are desired to point out that it is greatly to the interest of producers and importers that the proposal should be carried into effect, and to add that it has the unanimous approval of the Committees of the Indian Tea Association (London), and the Ceylon Association in London. If you see your way to support the proposal, we shall feel obliged by your returning to either of us as soon as possible the enclosed form duly filled up.—ERNEST TYE, Secretary, the Indian Tea Association, London. WM. MARTIN LEAKE, Secretary, the Ceylon Association in

I/We, the undersigned grower or importer of Indian Ceylon, Java, or China teas, hereby agree that any teas I/we may put up for auction at public sale, in London, on and after a date to be hereafter determined by the Joint Committee of the Indian and Ceylon Association in London, but not before July 1 next, shall be sold on the express condition that no allowance for draft be made to the buyer.

This I/we agree to carry out, provided the Joint Committee of the two Associations receive in their opinion sufficient support to ensure the adoption of the proposal.

[Here follows name of firm, proprietor, or company and quantity represented of Indian, Ceylon, China and Java teas.]

MEMO. AS TO ALLOWANCE OF 1 LB. DRAFT ON TEA SALES.

1. The profit on tea cultivation having reached such a narrow margin it became imperative on the grower to curtail every item of expenditure in India and Ceylon to the very lowest limit, and in consequence many forms of allowances which were common in better times have of necessity been abolished.

2. It has now unfortunately become necessary for the grower to extend this pruning down to unnecessary charges and allowances on his teas in London, and the most obvious of these is the allowance of one pound draft per chest or half chest.

3. This allowance has long been looked upon by the grower as an unwarrantable tax upon his teas, and it is held that the time has come for it to be abolished.

4. During last year there were imported into London :

		Chests.	Half-chests
From India	..	1,286,998	285,664
„ Ceylon	..	831.406	316,090
		2,118,404	601,754

and the allowance on these from draft alone amounted to 27,20,000 lb.

5. And this is not all; for, by the present system of weighing by H.M. Customs, a turn of the scale is given in the buyer's favour on the gross weight and another on the tare weight. Each of these may give the buyer a maximum advantage of 15·7 oz., so that the two together average close on 1 lb. of tea per package, exclusive of draft.

6. Taking then the two forms of allowance (namely, draft and weighing) together, the buyers on these figures received 5,000,000 lb. of tea more than they paid for.

7. Without raising the question of an alteration in the system of weighment there is no reason why the draft allowance should not be abolished. It is a survival from times and conditions which no longer prevail, and it is not exacted in countries other than Great Britain, to which India and Ceylon supplied last year 560,000 chests.

8. In 1890 all draft allowance was abolished on cured provisions and cheese, the same has been done in the case of bark and other articles, and the same should be done now in the case of tea.—*H. and C. Mail*, May 5.

SIR A. MACKENZIE AND THE TEA PLANTERS.

Sir Alexander Mackenzie's thrice unfortunate aspersions on the tea-garden managers have aroused much indignation and no wonder. Although in giving evidence before the Currency Commission the ex-Lieutenant-Governor does not say in so many words that the manager are for the most part incompetent, he groups his answers in such a manner as to leave his hearers no alternative inference. Yet when we read on, we find that his grievance really is that "the conditions of profitable cultivation have changed." Surely that is not the manager's fault. Machinery has come in, says Sir Alexander, and with it the practice of amalgamating a number of

gardens under one management. The management that is called for under these conditions is expert and "it is hard to get." And yet one heard of large numbers of experienced tea planters who were to be met in Calcutta last cold weather looking for work in vain. That fact scarcely bears out Sir Alexander's petulant remark. Of course it is very annoying to be a shareholder in a company which does not pay a dividend upon the season because its manager has been dismissed, but, after all, surely that is a very small fact from which to argue the general laziness or stupidity of a large body of gentlemen. Sir A Mackenzie complains that the pampered tea planter picks up his experience "at the cost of the shareholders." There is a very general impression among those who know that he picks it up too often at his own,—*The Englishman.*

FACILITIES FOR MAKING GOOD TEA.—VII.

Dealing with two replies dating from Dikoya, one from Agrapatana, and one from Kotagala, we find the drawbacks to making better tea considered from different standpoints. One Dikoya planter, while holding the ignorance and carelessness of tea makers and coolies who try to hurry through their work, responsible for much, considers the teas now produced far superior in make to those turned out, say four years ago, and that it is only over-production and combination among buyers which has stood in the way of better prices. The other is unable to detect any special cause, though jât, soil where previously under coffee, rush of leaf, and neglect of pruning followed by severe cutting down, play their part in keeping down the quality. Agrapatana thinks the failure of buyers to give value is the great drawback to making better tea, as the district possesses great advantages; while Kotagala pleads unseasonable weather, want of accommodation and machinery in some places, and want of attention in others, as hindrances to improvement. On jât there is nothing new to record, as there is the usual variety, though as a whole all the districts have fair working bushes varying from good and medium to inferior in the first plantations. In soil, Dikoya is content to claim medium, but generally good for tea; while Agrapatana rejoices in decidedly good soil, and Kotagala regards its soil as not generally poor, though parts of most estates are worn. Mr. John Hughes' letter should draw special attention to the impoverishment of soil which immediately attends heavy and continuous showers, and the necessity of providing safeguards against avoidable loss, whether of soil or its more valuable constituents. While one Dikoya planter unequivocally declares in favour of manuring, the other insists that a dose of manure which shows good results exhausts itself in two years, after which the bushes suffer if the dose be not repeated; and with prices under 8d. per lb. there is very little profit in manuring. But may not the profits disappear altogether without manuring? From Agrapatana comes the warning that manuring, to do good, must be scientific, and in that description is not included "the usual castor-cake and bones," on which, however those who have tried the combination generally report favourably. Kotagala adds its testimony in favour of manure, as both improving and profitable where the soil is not too much worn, and where neglect has not continued too long. Then it is a question of "Will it pay?"

In regard to factories, one Dikoya resident declares that most estates are deficient in withering space and that prices are seriously affected in consequence, through Visiting Agents, with no practical knowledge of the details of work, opposing extensions which the working Superintendent feels to be essential. The other Dikoya planter takes a different view, holding that most factories have ample room for nine months of the year, but the space is found insufficient generally during the rush in April and May. The question is, we suppose, whether additional expenditure will be justified by the saving of the loss that insufficient withering space leads to; but the latest invention will, perhaps, effect a revolution, and those who saved in buildings may yet rejoice! In Agrapatana there is no deficiency in withering space; and the sufficiency is specially mentioned as an explanation of the high average prices the District obtains; and Kotagala, too, finds that the want of space has been supplied in recent years. Dikoya is, generally, well supplied with machinery (save in respect of sifters and roll-breakers), and also with motive power, except during the dry season; and Agrapatana and Kotagala, too, are generally satisfied with the equipment of their factories. The labour force has been ample in all three districts—Kotagala experiencing that pleasure after five or six years. Dikoya holds two views of pruning—one that it is neglected too long, and then the knife is applied with too great severity, the other that poor jâts must be severely dealt with to yield paying flushes; but V.A.s are said to worry the bushes with too early plucking, to ultimate injury of the estate. While Agrapatana has not suffered from severe pruning, Kotagala complains of much too severe handling after prolonged neglect. From Dikoya and Agrapatana the unanimous verdict is that both soil and climate are most suitable for tea, the only drawback being that many of the earlier plantations had to be pushed on without reference to jât, and with undue regard to economy in consequence of the collapse of coffee. The results in such cases are sadly apparent now. This is a drawback from which Agrapatana evidently has not suffered; but Kotagala is burdened with land which had been for long years under coffee, and such cannot be expected to yield large returns.

COCONUT PALM CULTIVATION.—Cultivators of coconut palms in the Straits Settlements, who have been troubled by beetles and by "the effects of sugar estates on coconut plantations," will read with interest the letter of "W.J." elsewhere, as one of our most experienced Ceylon planters. In answer to his enquiries as to nature of soil, multiplicity of beetles, &c., we shall be glad to hear from any one having a knowledge of the conditions in Selangor and other divisions of the Straits Settlements.

CEYLON TEA IN AMERICA.

THE WORK OF PIONEERS.

(Reminiscences by an ex-Ceylon planter J M.M.)

Philadelphia, April 1899.

I have taken a *pioneer's* interest in many things during my life, but no interest has cost me so much as *Ceylon tea*, and yet I turn with an apparently undying interest to Ceylon tea with every good wish for its success—I may say—indigenous to the 'make up' of my being. My position is that of the bird that flies with the wind (or, for a change, against it) *free*. I am not financially interested (in my work) and I am happy. I take a bird's eye view of the Tea Trade in the United States of America, and in doing so, quietly consider Why's and Wherefore's, look at things as I see them *generally* without bias. To take wing to Ceylon (I wish I could) I, in my dreams effect a mode of my own for quick transit. How much, do planters (so many of them my old friends, I see by the Directory) hear what resident planters have to say about America? *How* much from "late" planters *now resident* here in America as merchants? How *very little* do they hear from the retailers of Ceylon tea who sell your tea to the American people! I *hope* to do *some* good in *this* respect. I am known today, in Philadelphia, the moment I introduce myself—not only to tradesmen or tea men, but to Philadelphians generally as "the man who hung about 13th Market and Arch Street in four different stores. for five years—shouting out (metaphorically writing) about Ceylon Tea to an unresponsive public! Five out of six (to whom I may thus introduce myself) answer. "What? Were you under St. George's Hall"? "Yes, in the dreariest depths of basement." I can always answer! My signs were large, and demonstrative—being on a level with the eyes of the "passer by"—(please note "passer by") but they all seem to have passed by once at least—and remember my store.

My saddest recollection in connection with this store is that of our dear old friend from Aberdeen —via 20 or 30 years in Ceylon,

JAMIE GARIOCH.

He wrote me from Canada when he was stranded and I was in no position at that time to ask him to join me; but he turned up, and for about a year represented me in my store. Good, kind-hearted old soul, but dying on his feet. I suppose everyone who knew him, knows that he finally landed on his native heath, Aberdeen, and died at peace with the whole world among his friends. Little do those who have not cast their lot in a country like this realize what it is to "get left" in life, particularly in old age, after leaving Ceylon. Not until they have experienced such a position can they possibly imagine what lifeless and ambitionless existence means.

Another good old Ceylon man was represented there, viz.:

VERE MILLINGTON,

a good, cheery, kind and true-hearted man as ever lived. I have always looked upon him as the actual impersonation of "Mark Tapley"—and if any living being enjoyed and could repeat Dickens —Vere Millington was the man. He served me in the midst, and through the midst, of my troubles. I only learned to appreciate him after I thought he was torn bone from bone—dead and gone—annihilated by misfortune and mishaps. But after I had buried him, through false information from friends, he turned up serenely, not only able to walk, but through having to carry an overweight of avoirdupois actually (what shall I say?) unable to walk, or nearly so. The laugh was there and the happy temperament seemed to bear up all the weight he could gather from the flesh and all the sorrows he could glean from the d—l. There is a man who did me personally great service, never yet repaid, but was and is now more than appreciated. He was, in this country, a plucky fighter under the most trying circumstances, kept his head level, "kept a stiff upper lip," met misfortune with a merry laugh, and when at last dropped some 20 feet on to an asphalt floor from wheels revolving like lightning of heavy electric engines stripped of his clothes, half-a-dozen bones broken and in a generally mangled condition, unconscious, he wanted to know where they were taking him to, and why they didn't get him his clothes and let him go home to his wife as a decent although unfortunate man! I cannot, of course, remember exactly what he did remark, but what he said was to this effect! I saw him and his good wife on the last visit they made, and they were both looking great. I have lost their address in England, and can't write; but would be glad to know how. His property I heard (from himself) was doing him all that was necessary for a livelihood, and no one is happier to know it than the writer.

As I write, I have received letters from three prominent firms in Philadelphia, representing tea (retail). They speak for themselves. I expect others as time goes on, and will gradually afford you matter from which you may eventually be able to arrive at a consensus of retailers' opinion, representing finally an undebatable philosophy regarding Ceylon Tea in America.

CEYLON AND INDIA *vs.* CHINA TEAS.

November 9th, 1898.—Editor, "Journal of Commerce and Commercial Bulletin," New York.—Dear sir,—I note with interest a letter upon "China vs. Ceylon Teas" in your paper of even date. Only a very few years since I was a believer in the theory that Ceylon and Assam teas were too strong, too rich in tannin—"too rich for our blood"—in fact in this dry electrical climate of ours, but I could well understand the high favor which these teas met with in England because the wet damp climate with its raw benumbing cold, in the winter months (that characterizes the major portion of the weather in England, Ireland, Scotland and Wales) demands just such a nourishing, such a "grateful and comforting" drink as can alone be obtained from a cup of rich, full-bodied and fragrant Ceylon or Assam tea.

In fact in my various visits to the mother country I was so captivated with their "two shilling" teas, for instance, that I would bring some home with me for my own table, but I fancied that they did not taste nearly so well here as they did in England, which was probably due to the difference in climatic conditions; but the taste for them grew upon me and I finally began to experiment with them in our various blends which we sell so largely throughout the United States—at first gingerly and mincingly,—fearful of making mistakes, but as popular approval in the shape of increased sales and enthusiastic commendations followed upon each increase of the proportions in which we used them in the "blends" we have finally reached a point that we never dreamed of, and that is to say that very nearly half of the stocks of black teas which we now carry in our warehouses is of Ceylon or Assam growth. Nor can this be called a matter of partiality either, because we find that their use now in our blends is imperative, we could not well discontinue them if we would.*

* This is precisely the principle that I advocated 12 or 13 years ago, and find endorsed by the retail trade of today—what follows is merely a repetition of my old arguments.—J.M.M.

If any dealer doubts the value of our experience in this respect, let him start say with an addition to any of his black or mixed teas, of 10 per cent. of good Ceylon or Assam tea, then let him bide result, and when popular approval does surely show itself, let him then gradually increase this proportion, until he has say a third of good Ceylon, a sixth of Congou and the balance of Foochow oolong, and let him note the pleased looks of his customers as they come back for more of "that very same tea" which they got before—"it was just splendid."

We candidly admit that the mixture of these teas in our "Caricol Blend" has more than trebled its sales and that not alone in territory (like the coal regions of Pennsylvania where a heavy-bodied tea is always in vogue) but in all parts of the country, in the far west where pan-fired and basket-fired Japans are the rage, and in the South where Chinese greens are used largely, as well as in New England where the people are partial to straight Formosa oolong, so that I am sure the time has come when the Chinese and Japanese tea growers may well look with apprehension upon their vanishing trade, not alone in England but in America as well.—Yours truly, THOMAS MARTINDALE.

[No statement of facts could be clearer or more truthful than the above—and I anticipate an answer to the similar effect from every grocer who favors me with a written expression of his opinion regarding the value of Ceylon tea as a staple article in America.—J. M. M.]

November 15, 1898.—Editor, "Journal of Commerce and Commercial Bulletin." New York. Dear Sir,—Replying to Mr. A. R. Robertson's criticism upon my letter of November 9th, which he good naturedly assures your readers "is not captious," permit me to say that in writing to His Excellency Li Hung Chang, as I did two years ago, it was not because my predilections were so strongly in favor of Chinese or Japanese teas; but it was in protest against a pictorial form of advertising then used by the Ceylon and Assam Planters' Association, which I believed was not only hurtful to the China and Japan tea trade but to the Ceylon and India teas as well, and which form of advertising I am rejoiced to see has been dispensed with.*

I have always maintained that it was questionable policy for a business rival to attack another, either in public or private, or for an advertiser to try to advertise his own business by ridiculing or humiliating his rival, and this from my point of view was what the representatives of "machine made" teas were doing, when under their direction a lot of scenes were published, showing almost nude Chinamen, reeking with perspiration, standing over the firing-pans, firing tea; the scene showing likewise an occasional pig running in and around the firing room, by way of variety. Now granting that this picture was true to life, would it not breed in the imagination of nervous and refined men and women a feeling of repugnance to all teas, as it would surely raise in their minds an element of doubt as to the cleanliness of any teas, machine made or hand made?

Mr. Robertson wants to know if a cup of good congou Oolong or Formosa may not be as "grateful and comforting" to us in our dry climate as the Ceylon or India teas are to the tea drinkers in the cold wet climate of England. I unhesitatingly reply, "Yes." † In fact I think that Ceylons or Indians "straight," (that is by themselves) are too rich in tannin; too full bodied for the lovers of tea in America, while they are "just the thing" over there. But my argument in their favour is as to their use in connection with other teas; that they will improve and "bring up" almost any teas that they are blended with. [Why didn't Mr. Martindale write this 12 years ago? Too late *now*—so far as I am concerned.—J. M. M.]

Mr. Robertson suggests that the marvellous success which we have met with is pushing our "Caricol" blend of tea, may be the result of the clever advertising it has received. This might be so as initial orders, else why spend money for publicity; but when the "*repeat*" * orders, begin to come in and keep on coming year after year, then it shows that it is the inate merit of the article itself that is doing the work.

I believe with Mr. Frank Munsey of magazine fame, that the man who tries to give the public the most and the best for its money will always win over the man who tries to make the most out of the public and give the least he can. The public day by day through the redundancy of newspaper, circular and poster publicity is becoming more enlightened and more critical; and while advertising may build up a trade, it can never hold it if absolute merit is lacking in the article advertised

In this connection it strikes me as strange that members of the tea trade in this country do not advertise more than they do.† I venture the assertion that $20·00 is spent in England in advertising and pushing teas to every single dollar that is spent here. Everywhere in the British Isles, you are confronted with tea publicity in some shape, form or other; even the theatre is not free from it, as witness this from one of Colley Cibbers characters—Lady Gentle: "Tea, tea! thou soft, thou sober, sage, and venerable liquor; thou innocent pretext for bringing the wicked of both sexes together in a morning; thou female tongue-running, smile-soothing, heart-opening, wink-tipping cordial, to whose glorious insipidity I owe the happiest moments of my life, let me fall prostrate and adore thee!"—Respectfully yours,

THOMAS MARTINDALE.

Philadelphia, Dec. 7th, 1898.

To the Editor, "Journal of Commerce and Commercial Bulletin", New York City.

Dear Sir,—As Mr. E A Willard states in his letter, published in your paper of December 3rd, that "he will not answer the parties seeking to advertise their particular brands through the medium of correspondence in your columns' and as I am the only man so far who has mentioned a particular brand in this correspondence, I must take it, that I am the one whom he will not answer: may it not be that the position I take in this controversy cannot be answered, or rather refuted? And that is, that the mixture of a certain portion of Ceylon or India teas with a blend of other teas, is invariably beneficial; in fact, Mr. Willard seems to admit this when he says, "That Ceylon and India teas have some merit and are desirable in blending, is true" therefore I may take it for granted that my position is unassailable, even if in order to clinch my point I was compelled to mention the "Caricol Blend."

Mr. Willard seems to object (with some show of temper too, by the way) to the fact that India and Ceylon teas are expensively and extensively advertised, "that hundreds of thousands of dollars are being annually spent" in advertising India, Ceylon and Japan

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* Here again I agree. To picture *Tea* as subject to such methods of preparation in *any* country, is injurious to tea of *all* kinds. To build upon the wrongs of others as a means of raising ourselves is poor principle and to have recourse to illustrating the vilest methods of tea manufacture or preparation as an advertisement of the legitimate and actual treatment accredited to *all* countries where tea is known to be cultivated is surely open to criticism, and ought to be stopped by legal enactment.—J. M. M.

† What have I argued from first to last?—J. M. M.

* The *repeat* orders form the principle of successful issue.—By the gradual treatment of China and Japan tea drinkers to a taste for *body* in the liquor. Ceylon can eventually swamp the demand for the others and establish the demand for *itself* in its purity.—J. M. M.

† The tea houses in America do, as a rule, advertize, but what? Not the tea on its own merits, but what kind of present goes with the pound! That is what I see everywhere, and the people are fools in this respect. They do not dare criticise the quality of the tea even if they can, for they know the answer they would get "what can you expect, with such a present?"—J.M.M.

teas by "foreigners." Is it a crime or an offence against society that "foreigners" should spend their money in such a lavish manner to advertise teas which the gentleman himself admits "are desirable in blending?" Will it not rather strike the candid reader that may be in some manner the gentleman's interests or holdings of other teas may be jeopardized in their value? Not only by the successful advertising these "foreigners" indulge in but also by its results in increasing the consumption of a tea which he would have us believe (on the authority of two English doctors) will produce "intoxication." If this should be the underlying reason of the objections, the gentleman raises against Ceylon and Indian teas, the logical conclusion is, that he himself ought to start in and advertise "the purity and more delicate flavor of Chinese teas" with the same vigor and persistency that these "foreigners" show in their methods of "making publicity."

I entirely agree with Mr. Willard, however, in regard to some of the "extravagant statements" used by these "foreigners" in their advertisement, and I have always maintained that certain pictorial advertisements which they have used are calculated to discourage the drinking of teas of any kind, and as a case in point I note in Mr. Blechyndnes reply to Mr. Willard in your paper of the 6th, the claim which he makes as to the use of night, soil as a fertilizer by the "Mongolian tea planters" while the statement may be, and undoubtedly is possibly true, yet such a story in a public point is bound to breed disgust in the minds of tea-drinkers who may say "well how do I know but what such fertilizers are used upon all the tea plants. I'll be hanged if I'll drink any tea at all. I'll drink plain hot water first." And I also agree with Mr. Willard that the quality of China teas imported here, has improved very much during the past two years, and yet I must disagree again with him, when he states that Chinese teas are so much purer and of better flavor than Ceylon or India teas. If this were so, why don't the rejections by the tea inspectors show it to be so. There have been over a million pounds of China and Japan teas (mostly the former) rejected by the tea inspectors, since the new inspection law went into effect, and as far as my recollection goes, not a single chest of Ceylon or India tea has been rejected in all that time. What stronger proof of their purity and flavor can be asked for?—Respectfully yours,

THOMAS MARTINDALE.

February 10, 1899.

Editor, "Journal of Commerce", New York.

Sir,—It would seem from the various letters which appear from time to time in your Journal in connection either with the Tea Inspection Law or the war duty of 10 cents, that the Tea Trade as a whole is a marvel of inconsistency, (may we not rather say inconstancy).

The Inspection Law was championed and lobbied through congress by the leading members of the trade, and loud was the acclaim of these same men when it was put into operation.

The next thing that the tea men wanted was a duty and letters by the thousand were sent to Congressmen and Senators pleading with our legislators to place a duty upon tea. Whether this movement was undertaken to benefit the holders of large stocks of tea or for motives tending to benefit the public good will never be known, but the fact that the duty was advised and requested by some of these very men who now "kick" against the pricks, which are caused by the Inspection Law and the duty as well.*

It is unquestionably true that both causes combined have resulted in the nearly total disappearance through the channels of consumption of all the old teas with which the market has been burdened for so many, many years, and it is safe to say that probably in no country in the world can so little poor tea be found as at the present time in the United States. What a startling contrast this is to the condition of the Tea trade a short five years ago, when it was loaded down with mountains of trash without character and without any vivility or actual worth save that of making bulk. The writer recollects vividly that in purchasing the general stock of a wholesale grocer who was declining business after a busy career of over a half century, that his stock of tea upon examination was found to be absolutely worthless. The tea lead which encased it had become oxidized and had separated into little globules of lead which was sprinkled through the tea. The owner stated that he had purchased it during the war at a cost of over two dollars a pound, and he sorrowfully said, that he really "hated to part with it. It had been with him so very, very long." It was sent to the auction-room and was bought by those who cared less for quality than they did for price, at seven cents per pound, but today if a man were hunting for that same sort of stuff in any fair sized quantity he would have difficulty in finding it, even at two dollars a pound, as the country is now practically clear of all such trash.

The duty and the inspection law having brought about this happy condition of affairs, the "inconstant leading tea men" now commence to make lamentations against the enforcement of the inspection law, and turn their tearful eyes to Congress for a repeal of the duty, else they say the poor people will stop drinking tea and will drink coffee only; that the price has already gone beyond the poor man's purse, etc., etc. Yet only this week in the city of Philadelphia, a blend of teas was offered at 33 cents in forty-three stores with the choice of a can of tomatoes, corn or peas thrown in as an inducement to buy the tea.

I went into a little grocery store on Wednesday of this week to wait for a street car, and while there, out of curiosity, purchased a quarter of a pound of their cheapest tea, for which I was charged eight cents.

The best known blend of tea now before the country (the "Caricol Blend") is being retailed at 34 cents per pound in the East and West and North and South, so that the poor man cannot yet have suffered very much from either the operation of the Inspection Law or the duty, and the chances are that the competition in trade will continue to give him a pound of good, pure, wholesome tea at from thirty-four to thirty-eight cents. for years to come, which in actual merit will be worth two pounds of such stuff as but a short year ago he bought for the same price but with a glass, or a cup and saucer or a chromo thrown in. He does now surely lose the chromo and the glass dish and the piece of china, but he gets what he did not get before—good tea, which instead of driving him to drink coffee as a substitute, will make him a more liberal user of tea than ever, because it may be that he never knew before what a cup of good tea really was, and the "cup that cheers but not inebriates" will then become his daily solace, his comfort and his necessity.

THOMAS MARTINDALE.

* The imposed duty of 10 cents per pound has done *good*, and further litigation as to protection against refuse is better. The U. S. A. is year by year presenting a more substantial field for the Ceylon planters to claim as their special interest. A word to the wise ought to suffice!—J. M. M.

INSPECTION OF THE PEARL BANKS.

The following report by Capt. Donnan, Master Attendant, has been placed at the disposal of the press:—

Master-Attendant's Office, Colombo, 14th April.

Sir,—I have the honour to report my return to Colombo on the 13th instant from an inspection of the Pearl Banks on west coast, lying off Arippu, Karaitivu, and Chilaw.

2. The banks examined off Arippu were the Cheval Paar, Southern portion of the Periya Paar, Moderagam Paar, Kerai, outer Vankalai Paar, Kallatidal Paar, Kondache Paar, and Jaggenboon Paar.

3. Large beds of young oysters from 3 to 6 months old were found on the Periya Paar and

on the outer Vankalai Paar, but no oytsers whatever were found on any of the other banks. The few small patches of young oysters that were found on the east side of the Cheval Paar last year have entirely disappared.

4. The banks examined off Karaitivu were the Dutch Moderagam, Kaaraitivu Paar, Alantua Paar, and Muttuvanatu Parr. No oysters were found on the Dutch Moderagam, Karraitivu Paar, and Alantua Paar. The Muttuvaratu Paar, which was so promising two years ago, I regret to report, failed completely. During the two days employed in going carefully over this bank only 120 oysters of ½ to 3½ years old were found, so that practically the 72 millions of young oysters estimated to be on this bank in March, 1897, have completely disappeared. I had to report last year of a very large reduction in the number of oysters on this bank, but I then hoped that the oysters left, being older and stronger to resist attacks of fish, would remain on the bank and come to maturity. The only evidence found of the cause of the disappearance of some of the oysters was that of a few of the empty shells sent up by the divers having a piece broken off them, large enough to have caused the death of the oysters, and it seemed to me that the pieces had been bitten off the shells by some fish. There were not, however, many of the empty shells damaged in that way. Out of a total of 55 picked up there were only 5 damaged, the remaining 50 were perfect, and showed no sign of the cause of the death of the oyster. The bulk of the oysters, however, must have been removed from the bank entirely otherwise, many more empty shells would have been found, and therefore, the cause of their removal remains a mystery. It is probable, however, that they might have been removed entirely by large fish such as skate, which would crush the shells in their mouth, and swallow the fragments of shells along with the oyster. I have found the stomachs of rock fish, of 10 to 15 lb. in weight, that have been caught on a bed of young oysters, full of fragments of the young oysters' shell and if such fish swallow the oyster shell, it is very probable that larger fish able to crush the shell of older oysters would do likewise.

5. The banks examined off Chilaw were the Udapankane Paar, Muttundi Paar, Jakempiddi Paar, Kanukupany Paar, Chilaw Paar, Manatty Paar and Ungul Paar. No oysters, however, were found on any of these banks.—I remain, sir, your obedient servant,

(Signed), J. DONNAN, Master Attendant.

To the Hon. the Colonial Secretary.

CEYLON TEA COMPANIES: SCOTTISH CEYLON—PROPRIETARY —RAGALLA.

We publish reports of the annual general meetings of the above Companies, the latter of which alone declared no dividend.

In the case of the Scottish Ceylon a slight falling-off in results had been reported, and the rise in exchange had added £500 to the expenses of production. The average price, too, was 3½ cents down from that of 1897; nevertheless the Company was able to pay a satisfactory final dividend of ten per cent. But for the inconsistency of the seasons, apart from other causes, it would doubtless have been appreciably higher.

In the Ceylon Proprietary Tea Estates Co, the rise in exchange was responsible for a £900 increase in cost of production, while on the other hand the Company's prices had kept level with those of the previous year. The Chairman, however, stated his opinion that they were still below what they should be. With from 220 to 250 acres of young tea not yet in bearing, the declaration of four per cent dividend was creditable enough.

No dividend from the Ragalla Company was something of a surprise, when the news reached us by cable. Kelburne, the Chairman has now said, had been their disappointing property owing, first, to the rapid failure of the old coffee on the estate, and then to the shade from the coffee-trees hindering the growth of the young tea which was put in. Reference was made to Mr. W. L. Strachan and his report, which we have already published and which showed that in the Ragalla Group there was a fine possession which would rise superior to the handicapping incubus of Kelburne, more especially if the latter began to lose that character. Though no dividend was paid, it was satisfactory to learn that the capital account would in all probability be closed with the expenditure of £600 for the current year, unless a Pelton Wheel were installed, costing in all, £500. For this Company the dawn seems at hand.

CEYLON TEA IN CANADA.

STRONG MARKET REPORTED.

We publish a cutting from the "Montreal Daily Star," kindly sent us by a friend now visiting the Dominion, in which a remarkably strong market for tea is stated to have been the "feature of the grocery trade" during the last week in April. So much so that local dealers in Montreal had, at the date under notice, April 26th, shipped to London packages of tea at under 10d per lb. to the number of 1,600! Accordingly the local demand for low priced teas became for them very difficult to meet and prices had risen in consequence. It is further remarked that as China is not producing so much as hitherto, Ceylon and India blacks having driven out the Celestials' and as the former have been 11 millions lb. short of requirements, the deficiency cannot be remedied for some time; the Indian and China markets not opening till about the end of May, "while the small supply from Ceylon will hardly be noticed."

We are surprised at the later statement; but surely in view of such contingencies as that reported, it is, or rather it was, a mistaken policy for Ceylon producers to starve the London market, when there has been such a call for assistance that away West Canadian dealers have had to help in the supply and have been driven into a corner to meet local demands. Rises of 40 or 45 per cent are no doubt pleasing enough as results, but a little less of the starvation policy should increase sales immensely. We refer specially to the low-grade teas, concerning which we see that fears are entertained in the Dominion that the Indian and China may not reach them till September or October. Meanwhile Ceylon should be able to some extent to step into the breach with some brisk and substantial shipments.

THE WEATHER AND CROPS.

THE effects of the trying drought, which almost all parts of the Island experienced during the first quarter, have not quite disappeared yet, so far as the Export Tables are an index. We are now in the last week of the fifth month; and the Chamber of Commerce tables, made up to the 23rd May, which we published for our *Overland* edition and issued as a Supplement afford an interesting and instructive study. The form, in which we publish the Export Tables, enables our readers to see at a glance how the leading exports at the end of every week compare with the quantities sent away for the corresponding period of the three previous years. The tea shipped this year, so far, is 43,836,320 lb., and is for the first time, we believe, in 1899 ahead of the quantity shipped last year; and that only by about 220,000 lb., while it is still short of the exports to 23rd May in 1897, which reached 44,782,326! We know no reason for the falling-off, except the drought at the beginning of the year, coupled to a small extent with the frost in the highest districts. The last ground which has been already made up, gives promise of the realization of estimates for the year—though it is too early to prophesy confidently, or to revise the estimate. Coffee, curiously, has outstripped last year by nearly 1,000 cwt., albeit the quantity sent away is a miserable 6,344 cwt.; but the drought which told so disastrously on tea flushes was precisely what would bring out a blossom on coffee; and who knows but that the season may literally bear fruit next year, and help to swell the exports of the now despised berry? Cinchona, too, exhibits a leaf, with 336,700 lb exported, which is about 50,000 lb. in excess of last year, and 3,000 lb. in excess of 1897. The rise is probably due, rather to the upward tendency of quinine early this year, and the slackness in tea plucking and manufacture which set labour free for barking, than to any increase in the acreage under cinchona, or any greater attention to cultivation. Cocoa, 20,555 cwt. exported, is 5,400 short of last year, but the fall may be explained by the rule of alternate big and small crops. This year is 5,000 cwt. ahead of 1896 and 1897. So that the chances are against disease having had been much to do with the outgoing crop. Cardamoms, which are not immediately affected by drought, are ahead by about 18,000 lb., of last year when 202,021 lb. were sent away, but only 8,300 lb. in advance of 1897.

It is on low-country products, however, that the drought has told with the greatest severity. Only 583,339 lb. of quilled cinnamon have been sent away, or nearly 200,000 lb. less than last year, 300,000 lb. less than in 1897, and 150,000 less than in 1896! The deficiency in manufactured bark—which is available only when the weather favours a free flow of sap, without which "peeling" is at a standstill—has, however, been more than covered by excess in chips—generally coarse bark which does not peel, and which can be harvested (scraped off the sticks) all the year round. The 942,777 lb. of chips exported represent an excess of 370,000 lb. over last year, 400,000 over 1897, and 600,000 over 1896! Whether this immense quantity will tell on the prices of quilled bark is doubtful as fine bark is put to special uses for which chips are not suitable; and the deficiency in quills is really heavy. The prices now ruling confirm these doubts. The hand of the drought is to be seen in all the products of the coconut palm; for although oil shows a slight increase of 3,200 cwt., as compared with last year, previous weeks showed a deficiency, and the increase now recorded is scarcely proportionate to the growth of the palm industry, nor is it sufficient to compensate for the falling-off under other heads. Thus, in copra, which showed such splendid possibilities last year, there is a falling-off this year of 17,000 cwt. from the 114,435 of 1898. Desiccated coconut, in which there had been a steady progressive increase year by year, after the leaps and bounds of the earlier years of the new industry, exhibits a fall of 300,000 lb. as compared with 1898, and almost the same figures as 1897. In coconuts there is a fall of 200,000; and in poonac of 36,000 cwt. The two heaviest crops of nuts for the year have yet to be picked; but there is no reason to believe that these will be larger than the corresponding crops of the last two years. It is feared they will be smaller. If so, prices must go up, as the demand for copra is steady, and is generally stronger in the latter part of the year. The drought we have gone through will tell on the early crops of next year, too,—another reason why prices should be maintained, or even rise.

A product which shows a decided advance is one that is not grown, but dug up. We have sent away 210,280 cwt. of plumbago, against 161,255 cwt. last year, 123,398 in 1897, and 129,267 in 1896.

ASH OF CINNAMON BARK.—A fair amount of adulterated powdered cinnamon has been found in commerce in Germany, recently. Examination of a large number of samples of the pure drug have showed that the maximum quantity of ash should be five per cent, with not more than one per cent of silica.—From *B. and C. Druggist*, for May.

SALT AS A PLAGUE PREVENTIVE.—E. A. H. writing from Nice to the *Times of India*, expresses confidence in salt as a plague-preventive, and ascribes the immunity from sickness which he had enjoyed, during 35 years' residence in India, to a liberal consumption of salt with food. Even if the cheap and common condiment is not a direct preventive, there can be no doubt that an adequate use of salt goes a good way to sustain health; and it is the weakly ones who are susceptible, not alone to plague, but to all diseases. In this connection, it is interesting to learn that "further experiments are this summer to be made in the German Army with the object of ascertaining the exact value and sustaining power of sugar Two companies of two regiments from different army corps are to make long marches, and the more intelligent men will be provided with pure sugar and with pastilles of sugar to which coffee or lemon will be added, and which will be dissolved in the water which will be carried in tins by the men. Comparisons will then be made and the results reported upon."

NEW COMPANIES.

UKUWELA ESTATES CO., LD. (61,745).—Registered April 26th, with capital £17,000, in £25 shares (378 6 per cent. cumulative preference), to acquire the Ukuwela and Bowatte estates, in the Island of Ceylon, to adopt an agreement with F. G. Ambrose, and to grow, export, import, and deal in tea, coffee, cocoa, and other produce.

The subscribers are :	Shares
T. J. Lawrence, 165 Fenchurch St., E. C., merchant	1
W. H. Ambrose, Bartholomew House, E.C., stock broker	1
D. MacBrayne, jun. 17 Royal Exchange Square Glasgow, insurance broker ...	1
W. R. Kermac, 180 Piccadilly, W., stock broker	1
A. J. Walker, 12 St. Andrew's Mans, W. Kensington, stock broker	1
F. G. Ambrose, 165 Fenchurch St., E.C., tea planter	1
W. Harwood, 31 Lombard St., E.C., solicitor	1

The number of directors is not to be less than two nor more than five; the first are F. G. Ambrose (chairman and managing director with £250 per annum), H. L. Anley, W. B. Anley and J. P. B. Anley; qualification £250; remuneration £50 each per annum. Registered office, 165 Fenchurch St., E.C.

SELANGOR RUBBER CO., LD. (4,237).—Registered at Edinburgh, April 29th, with capital £20,000 in £1 shares, to acquire from C. R. Paterson and W. W. Bailey certain lands and concessions in the district of Klang, Selangor Straits Settlements, and to carry on the business of rubber, tea and coconut growers, planters, farmers and importers. The subscribers are:

	Shares.
T. Gallie, 11 Bothwell St., Glasgow, West India merchant	1
C. Paterson, Ayton House, Dowanhill, Glasgow, tea planter	1
J.G. Rodger, 1 Claremont Gardens, Glasgow, gentleman	1
E. Rodger, 1 Claremont Gardens, Glasgow, gentleman	1
T. Birminsary, 105 W. George St., Glasgow, merchant	1
H. Moncrieff, 45 W. George St., Glasgow, writer	1

The number of directors is not to be less than 3 nor more than 5; the first are T. Gallie, T. Johnston, H. Neilson and C. Paterson; qualification £250; remuneration as fixed by the co. Registered office, 44 W. George St. Glasgow.

SEFWI RUBBER CO., LD. (61,835).—Registered May 1st, with capital £1,000 in £1 shares, to adopt an agreement with F. Dawkins, and to acquire, own and work any rights relating to rubber and mahogany in Africa or elsewhere. The number of directors is not to be less than 3 nor more than 7; the subscribers are to appoint the first; qualification £100; remuneration as fixed by the co. Registered by Segar Bastard and Co. 56 Cannon St, E.C.—*Investors' Guardian*, May 6.

TEA IN CANADA.

REMARKABLE SCARCITY.

(From the MONTREAL *Daily Star*, April 26.)

MONTREAL SELLS LONDON A LARGE ORDER—A STRONG MARKET.

The strength of the tea market is undoubtedly the feature of the grocery trade this week. It appears that the Ceylon and Indian crops are about eleven million pounds short of the requirements and this shortage has had the effect of sending prices of grades under ninepence a pound up about 45 per cent. in the London market during the past few weeks.

Messrs. W D Stroud & Sons' say that Ceylon and Indian teas which were sold down at 5½d a pound two months ago cannot now be had at less than 8½d. Formerly, low grades sold to the trade here at 12½ and finest at 40c. while today the lowest cannot be had under 16½c. and the fine qualities bring 45c.

Reviewing the situation Mr. Stroud states that to show the excitement existing in the London trade, teas which blenders would not entertain at all two months ago sell quite freely today at 8d a pound.

In order to obtain sufficient for their requirements, London dealers have been sending even to Montreal for samples of all kinds of black under 20c a pound and local dealers have already shipped them some 1,600 packages.

Local dealers have now great difficulty in getting low price teas to meet the demand, and as a consequence of the scarcity, prices of some qualities have gone up 40 per cent. in the past three weeks. Green teas are also firmer.

One of the reasons given for the scarcity was that Ceylon and Indian teas have been gradually driving out the China blacks, and as China has not been producing the quantity heretofore produced, there are no stocks to take the place of the shortage in the other kinds. It also appears that the shortage cannot be relieved for some time as the China market does not open till about the end of May, and the Indian around the same time, while the small supply from Ceylon will hardly be noticed. As the best qualities are picked first it is not thought that the low grades will reach here before September or October.

PRODUCE AND PLANTING.

THE NEW SEASON FOR CHINA TEA.—The opening of the Hankow market, once an event of importance in Mincing Lane, has of late years chiefly concerned Russian and other foreign buyers. From time to time there are mysterious rumours to the effect that one of these days we shall see what we shall see in regard to China teas, but at present the indications of any remarkable increase of interest here in the doings at Hankow are few. Nevertheless, China tea has its uses in the London market, and the "Grocer," in commenting upon the opening of the new season in China, points out certain features of the demand, which are of general interest to the trade. It says: "Although operators here evince little interest in what is going on in Chinese teas, pretending that the dealers do not want them, and that the said teas are only asked for and drunk by epicures, connoisseurs, and old ladies of the aristocracy yet it must be owned that lately a more than average share of attention has been given by the blenders who have been sticklers for 'price' tea of common quality suitable for their special purpose, when there has been an unexpected and prolonged dearth of Indian and Ceylon descriptions of the lower class."

A "HUNGRY MARKET."—"This is a fact which should not be lost sight of when forecasting the probable future course of the tea maket in general, for in times of scarcity all nice distinctions of quality and degrees of reference are silently dropped and fanciful pickings and choosings of favourite growths have to make room for rough-and-ready purchases of whatever ill-assorted teas may chance to be on offer. It is very well to say as we have often heard it said recently, that many of leading wholesale men will not touch China tea while there is any Ceylon or Indian leaf to be had instead and even then it must always be 1d per pound under the lowest grades of British-grown teas. But circumstances, fresh in the recollection of the trade, have somowhat exploded this idea, and is proved by the revival of the demand that has been experienced for China tea at a certain figure, accompanied, as it has

been, by a considerable advance in value during the last few weeks, whilst the whole tendency of the London market is, if anything, still towards higher rates. The severely reduced stock in London, whittled down, to 71,129,450 lb. in contrast with 82,251,100 lb. on May 1, 1898, is sufficient proof of the poverty of the present situation in respect of not having at command an adequate and immediate supply of suitable teas for home consumption; and it can hardly be doubted that, when the new Monings arrive about the end of June, they will come upon what is significantly called a 'hungry market.'"

THE TEA DUTY.—Last night in the House of Commons, during a discussion of the Budget Bill, Mr. Broadhurst boldly moved to reduce the tea duty by one half. The Chancellor of the Exchequer pleaded that that involved the loss of a sum of between a million and a half and two millions. He really could not face such a contingency. On a division the amendment was negatived by 246 votes against 125, so that there need not be any further discussion about the tea duty outside the House of Commons for a time at least.—*H. and C. Mail*, May 12.

FACILITIES FOR MAKING GOOD TEA—VIII.

One letter from Nuwara Eliya, and two from the adjoining little district of New Galway, may well be considered together. The two last are agreed that the chief drawback to the outturn of a better average tea, is the rush of leaf during March, April and May generally; while Nuwara Eliya complains of the lack of "detail factory supervision," by which is meant, we suppose, that higher intelligence than that of the ordinary tea-maker is wanted in the factory, if full advantage is to be taken of soil, climate and elevation—all of which favour the manufacture of high-class teas. While the jât in New Galway is medium and the soil the same, Nuwara Eliya, being of more recent planting, undertaken when experience had taught the need of the utmost care in the choice of bushes, claims a decidedly good jât, with a soil which, though not uniform, is generally above the average. There are no worn out estates in these districts; but patches in the steeper and more exposed parts are giving way; and for these grevilleas are recommended, equally useful for firewood and for timber. From New Galway, we have one opinion absolutely in favour of manuring if prices kept up, and another favouring manure, if large yields are wanted, but prophesying a poor quality of tea. Why the tea which follows the application of manure should be poor, we are not told; but we thought that notion had been exploded by widespread experience. If not, it would be interesting to find out which manures are prejudicial to quality, and then to trace out the causes by the aid of scientific analysis. Nuwara Eliya, on the other hand, favours manures where transport is easy, but does not think the district requires refreshment just yet.

Nuwara Eliya commits itself to the declaration that all its estates are deficient in withering room, though factories on the whole are well supplied with machinery, and also with motive power, so far as water is concerned. New Galway, though in a more guarded manner, gives expression to the same complaint, one writer noting the deficiency of withering space in wet weather, and the other declaring that more accommodation would be a decided advantage in the best flushing months and in wet weather. Some estates in this district are deficient in machinery, but the motive power, being water, is always available. From all three planters we have testimony of the abundance of labour, and one specially notes the advantage it offers in permitting of careful plucking even in the months of biggest flushes. While New Galway tells us that there has been but little of severe pruning so far, the general opinion favouring light pruning once in two or three years; Nuwara Eliya insists that severe pruning must be resorted to once in nine or ten years, after three or four light prunings. In neither district has pruning been too long neglected; but while the pruning at first, of bushes planted on virgin soil, was practised once in three years, every other year is the rule now. Nuwara Eliya claims to be the most suitable district for tea in the whole Island, and New Galway declares that there are thousands of acres of forest in the locality, equal to any in Ceylon; but these are not available at present. It looks forward to the time when, lowcountry estates having replaced their tea with some more suitable and more profitable product, the Government will see the wisdom of removing present restrictions, and offering alternate blocks of 500 acres to public competition, above the present elevation limit. Though we ourselves look forward with hope to that time, we cannot agree in the wholesale condemnation of the lowcountry. But for its teas, Chinas would be once more in the ascendant; and, while there is a certain demand for low-grown teas, their remunerativeness cannot be questioned. And has there been any offer to beat that which has been made for the property of a lowcountry Company, whose shares stand at a premium of 300 per cent, and which has been declaring dividends of 25 per cent with astonishing regularity? *Per contra*, one of the letters from New Galway, while claiming that soil and climate are exceptionally good, laments the failure of the bushes in the vigorous appearance which characterized them some years ago; and it desires the aid of experts to ascertain the cause of the decline. We trust the explanation will suggest the remedy, and that upcountry and lowcountry estates alike will continue to contribute to the general prosperity by their teas of distinctive flavor and body.

RUBBER PREPARATION.

India-rubber preparation or separation, with all the improvements which are "in the air," is likely to be an important question for many Ceylon planters for some time to come. Mr. Willis has been telling us a good deal that is new and he and Mr. Parkins are likely to give us a good deal more erelong. Meantime, we have an interesting communication today from Mr. Hart of Trinidad in criticism of a paper by Mr. Biffen, which we copied into our monthly periodical some months ago. Everything

bearing on the subject of rubber separation and coagulation is of interest to us at this stage of the industry in Ceylon, and we are obliged to Mr. Hart for writing so freely on the subject.

TEA ON SALE OR RETURN.

At the Southwark County Court before his Honour, Judge Addison, Q.C., on Monday, the British and Benington's Tea Trading Association, Limited, of Southwark-street, sued Mr. C W Burton, a grocer, carrying on business at Hemsby, Norfolk, to recover £2 13s 2d, for tea supplied. The Association was represented by Mr. Philcox, and the defendant by Mr. Foakes.—Mr. Alfred Soopes, plaintiffs' traveller, said he took an order from the defendant for 45 lb, of tea, which was to be exchanged within two months for other tea if it could not be sold. The Association did not return any money. Defendant sold a portion of the tea and sent on the money, but said he could not get rid of the remainder. He was offered other tea in its place, but he refused to accept it and returned what he had in stock. It had not been accepted and was then in the possession of the railway company.—Mr. Foakes said that defendant had the tea on sale or return. He gave it a good trial but found it would not sell. He returned what he had left after four and a half months and sent on the money for the little he had sold. There was a distinct agreement between the defendant and his wife and the traveller that the tea should be had on sale or return. There was a certain inducement held out to purchasers which was that they would receive an article for domestic use in purchasing a quantity of the tea.—His Honour: I know; they give a present with half a pound of tea. That is very common—Mr. Foakes: Yes, but it seems to throw some doubt on the quality of the firm's tea, because if they sold a good article they would not require to give presents with it.—His Honour: That is not so with the Association. They do it to oblige ther customers—to enable your clients who sell tea in a village to get rid of it. But the question here is as to sale or return. I have never heard of tea being sold in that way, although I have heard of Sir Walter Gilbey doing business on sale or return with regard to wines. That was how he made his large fortune by supplying wines on sale or return. But sale or return business is one ordinary firms will not touch; it is fatal to their interests. (To the traveller): Are there any large firms in the tea trade who deal with grocers on sale or return.—The Traveller: Yes, there are. I know of cases where it is done.—Mrs. Burton said she gave the order for 45 lb. of tea at £4 2s 6d to the traveller, and it was confirmed by her husband whom she consulted with at the time.—His Honour: What was the arrangement entered into?—The traveller said we could have the tea on sale or return. There was no time specified as to when the tea should be returned if it was not sold.—His Honour: Are you sure it was sent to you on sale or return?—Yes, sir, or I should not have had it.—His Honour: What sort of tea was it?—No better than I sell at 1s 4d a lb.—His Honour: Why didn't it sell better?—I don't know; we pushed it.—His Honour: It is no reflection on the tea to say that it would not sell. There is a great deal of fancy in regard to tea. At one time people made a great fuss about Ceylon, but now they have come back to China after trying Indian.—Witness said that some very nice presents were sent with the tea, but customers wanted certain articles which the first customers had chosen, and would not buy the tea unless they could get them. That was one reason why it did not sell well, but she could not order another parcel just to get certain presents—His Honour: Did you give a present with each lb. of tea?—No, every ¼ lb. at 6½d.—His Honour: What! a quarter of a lb. of tea and a nice present for 6½d.! Have you ever bought from other people on sale or return?—Yes, the Ceylon Union Company, and I kept some of that tea seven months. I returned some I had had two years, and then I was allowed 5 per cent. discount.—Mr. Burton gave corroborative evidence.—His Honour said the defendant and his wife were more likely to remember the terms of the contract than the traveller who, in his zeal to do business, might have pushed the tea upon them on sale or return, and have forgotten he did so. He believed the defendant was supplied with the tea on sale or return, and therefore gave judgment for him with costs.—*Grocers Journal*, May 6.

INDIAN AND CEYLON TEAS.

The following letters appeared in the *New York Herald* of April 6th and 7th with reference to the lecture given by Dr. John Goodfellow, Ph.D., F.R.M.S. and published in that newspaper, on the 31st March, attacking Indian and Ceylon teas:—

Your article and correspondence on the subject o tea have amusing sides to teamen, as well as being liable to mislead your intelligent readers in this country.

Dr. Goodfellow's remarks undoubtedly applied to black tea, in the manner in which it is used in Great Britain, as in the lecture which formed the basis of your reporter's interview, he stated "that green teas contained more tannin than black teas." I would ask your attention to these facts:—There are 90,000,000 pounds of tea imported into America from China and Japan: less than ten per cent is China black, the balance is green and Oolong, with the exception of what comes from India and Ceylon, and which is known as "pure black" tea, no colouring matter being used in these countries.

In his remarks he emphasised the statement "that green teas contained more tannin than black teas, also more of the aromatic all," which he thinks "acts with a narcotic effect on the higher brain." It is quite apparent that between the teas available to American consumers, green and black, his recommendation would be for the pure black teas. The remarkable increase in their consumption all over the world is the best indication of their merits.

As regards the healthfulness of India and Ceylon teas, it is a matter of common knowledge that this was the sole beverage on which Lord Kitchener's army made its victorious campaign.

Concerning the healthfulness of tea, of which there seems to be some diversity of opinion, the following extract from a recent English paper is of interest:—Sir William Jenner, who died at the age of eighty-three years, had been Her Majesty's physician for upwards of thirty years. He retired from the Queen's service in 1893 owing to failing health. Throughout his busy career the physician's sole stimulant was tea. He drank it with his luncheon, he took it in his carriage while on his round of afternoon consultations, he drank it again at dinner, and tea was taken as a nightcap.

The great thing is to make tea properly, give it a short steep, and pour off the leaves, and it will not harm an infant, while it will stimulate strong men, doing the hardest of physical or mental work.

IMPARTIAL IMPORTER.

In your issue of March 31st you publish a very interesting article under the caption "Tea Drinking in all its Phases." The article in question, expressing as it does the views of Dr. John Goodfellow, Ph.D., F.R.M.S., naturally attracts more than passing attention.

In England practically nothing but black teas are used, and Ceylon and India tea has supplanted the China and Japan varieties. Now as to the effect of tea on the health of the public, Miss Florence Nightingale in her "Notes on Nursing" makes these comments:—"There is nothing yet discovered which is a substitute to the English patient for his cup of tea; he can take it when he can take nothing else, and he often cannot take anything else if he has it not. The only English patients I have ever known refuse tea have been typhus patients, and the first sign of their getting better was their craving again for tea."

India and Ceylon teas are black teas, and, as Dr. Goodfellow says, they are stronger than China teas. As a matter of fact, one pound of the former will make from two to four times as much liquid tea as the same quantity of China or Japan leaf. Assuming for argument sake that Ceylon and India tea contains more tannin than China black tea and as it takes from one-half to two-thirds less of the former than of China tea to make an equal quantity of liquid tea, is it not obvious that a cup of Ceylon-India must necessarily contain much less tannin than a cup of China tea?

Further, as Ceylon and India teas are unquestionably stronger and require a shorter steeping or infusion than China teas, and Dr. Goodfellow has laid down that the active desirable principles in tea are readily dissolved and the undesirable principle (tannin) dissolves more slowly, is it not also evident that tea which is prepared with short steeping is more hygienic than that which takes a long infusion to make a liquid sufficiently strong to satisfy the ordinary tea drinker?

TEA DRINKER.

THE DISTRIBUTION OF INDIAN AND CEYLON TEA.

In an interesting article in a recent number of the *Times of India*, dealing with "Some Facts about Indian Trade," we observe some suggestive facts on the exports of tea. During the past three years, the quantity exported from India has risen between 8 and 9 million lb.—from 148 millions to 157, to deal with round numbers. During the same period we have advanced from 11 to 12 million lb., that is from 108 millions to 119. Our big neighbour congratulates itself, as we do ourselves, on the growing quantities which find buyers outside the United Kingdom; and with good reason. Without a growing demand for our teas from all parts of the world, a fall in prices is inevitable—more correctly a further fall, as the downward tendency which producers have had to face during the past decade is primarily traceable to the supply having outrun the demand. The increased consumption in the United Kingdom cannot account for the whole of the growing output of British-grown teas. Other markets are essential; but it is curious that, while the Indian exports to Great Britain have steadily advanced during the past three years at the rate of about 2 million lb. annually, our own exports, after having leapt from 94 million lb. in 1896 to 99 millions in 1897, fell back to 96 million lb. last year. The decrease affords no ground for regret, as its explanation is, not any weakening of the popularity of our teas in the mother country, but a growth in direct shipments hence to countries which formerly drew almost all their supplies through London. A comparison of the figures in the table published by our Indian contemporary, with those in a table we have compiled, will show how much stronger has been our advance in other countries than that of India. The following is the table from the *Times of India*:—

	1896-97. lb.	1897-98. lb.	1898-99. lb.
To United Kingdom	135,456,884	137,655,857	139,245,995
,, Russia ..	457,634	689,271	500,889
,, United States ..	784,962	929,704	1,413,624
,, Persia ..	1,993,823	1,464,394	3,456,791
,, Turkey in Asia	1,981,197	1,336,970	2,598,281
,, Australia ..	6,155,895	6,792,654	6,306,135
,, Other Countries	2,078,066	2,582,967	3,948,957
Total ..	148,908,461	151,451,817	157,470,672

Our own compilation is as follows:—

	1896. lb.	1897. lb.	1898. lb.
To United Kingdom	93,936,361	98,930,059	96,133,833
,, Russia ..	246,233	439,349	2,714.003
,, United States ..	718 600	830,873	2,180,188
,, Australia ..	11,062.832	13,258,456	15,126,891
,, Other countries	2,177,386	2,595,830	3,614.166
Total ..	108,141.412	116,054,567	119.769,071

Persia and Turkey in Asia find no place in our Export tables, though Turkey (in Europe), from very small beginnings, took over 73,000 lb. last year; but India is a growing customer of ours with 924,000 lb., 986,000 lb. and 1,091,000 lb. the last three years. It will be seen at a glance how far ahead we are of India in Exports to Russia, the United States and Australia, and what strides we took last year in all three. On re-exports our Indian contemporary writes:—

Another branch of the tea trade seems to be in need of greater elucidation—that dealt with in the returns of re-exports of foreign merchandise. We received last year 3½ million pounds of tea from other countries, principally from Ceylon and China. Of this quantity 2¼ million pounds was re-exported, almost entirely to Persia. Presumably the bulk of these re-exports found their way into Russia. But the re-export trade in tea is in a very different position from that which it occupied in 1896-97, when we received for re-exportation over six million pounds from China alone.

NINE YEARS OF TEA IMPORTS INTO CANADA.

CONSUMPTION 4 LBS. PER HEAD PER ANNUM.

Imports of tea into the Dominion during the fiscal year ending June 30th, 1898, were 19,954,565 lbs. valued at $2,721,189.

In quantity, this is the smallest since 1893, when the figures were 18,034,897 lb.

The imports of tea into Canada during the nine years ending June 30th, 1898, were as follows:—

	Quantity in lb.	Value in. $.
1898 ...	19,954,565	2,721,189
1897 ..	24,317,104	3,310,348
1896 ..	22,667,535	3,252,133
1895 ..	20,610,733	3,115,025
1894 ..	20,459,530	3,039,928
1893 ...	18,034,897	2,975,452
1892 ...	22,593,619	3,650.940
1891 ..	18,042,043	2,981,415
1890 ..	18,451,378	3,073,643

The decline in the importation for 1898 cannot be ascribed to a falling off in the consumption of tea. It was undoubtedly due to the heavy purchases which were made during the previous year in expectation of a duty for revenue purposes being placed upon that commodity. Heavy stocks was the natural concomitant, which, in turn, caused a decline in importations. Consumptive requirements are limited, and, when one year the market is over-supplied, it is only to be expected that the next will be characterized by more cautious buying. Notwithstanding the decline, however, the average for the past two years exceeds that of the previous two, the average for 1897-98 being 22,135,834 lb., against 21,639,134 lb. for 1895-96.

The present fiscal year promises to witness another large importation of tea, the quantity brought in during the nine months ending March last being valued at $2,965,068. The monthly returns from which the figures for the past nine months are gathered do not give the quantities. In value, it will be noticed, the figures exceed those for the 12 months of 1898. The monthly average for 12 months of 1898 was $221,765, and for 1897 it was $226,425. For the nine months of this year it is $328,345

The fact that teas are costing more than in 1898 would in itself help to swell the value of the teas imported; but when the full returns have been issued, it will doubtless be seen that there is an increase in the quantity as well as in the value, particularly in view of the smallness of spot stocks in Canada in first and second hands.

It may, perhaps, not be uninteresting to note that the tea imported in 1877, 22 years ago, exceeded in value the imports of tea during any one of the past nine years given in the above table. In regard to quantity, however, the conditions were the very opposite, there only being 13,575,657 lb imported. Indirectly these figures show the difference in the price of the tea imported in 1877 and 1898 respectively, the cost being 25·90c. per lb in the former year and 13·63 in the latter, a decline of over 47 per cent.

Taking the population at 5,000,000 in 1890-91, and at 5,500,000 in 1897,98, the average consumption of tea in Canada per head during the former two-year period was about 3·64 lb and during the latter 4·02 lb.—*Canadian Grocer*, April 28th.

FACILITIES FOR MAKING GOOD TEA: BOGAWANTALAWA.

The information collated in our recent articles on this subject does not seem quite correct, to a correspondent whose letter is before us—more especially on the subject of MANURING. "The district, we are surprised to learn, is a stranger to manure," we are assured, is not correct. Seven estates could be named that have been manuring regularly for the last four years at all events—and six other estates that have either tried manure, and not gone on with it, or have just begun manuring and intend to go on with it. In regard to "Plucking" we are told that a good many planters have gone in for coarser leaf, because they find it has paid best, and is not so trying to the tea bushes: and "two or three estates which "have been most careful about their leaf: "and whose plucking has been the most "costly, are now getting hardly any better "prices than those that have gone in for "coarser leaf, and cheaper working." Again, we are assured that though "Withering Space" may be deficient in a few cases, as a rule the Bogawantalawa factories are as well found in this respect, and in machinery, as in most districts. No doubt, in every district one could find some estates that, for various reasons, are not as "up to date," with manufacture, and factory accommodation, as they might be, and especially so on estates that are not all in bearing yet; and the same, of course, applies to some estates in Bogawantalawa; but only to a few. Altogether, the summary we gave does less than justice to this fine district, and so we give prominence to the above corrections.

COOLIES FOR ASSAM.

REVISION OF IMMIGRATION RULES.

A set of revised rules under the Immigration Act for regulating the importation of coolies into the tea districts of Assam have now been published by the Chief Commissioner of Assam to remedy the defects existing in the matter of sanitary conditions, transit, food and clothing of emigrants, which were brought to light by the investigations of Lieutenant-Colonel R. Neil Campbell, who, in consequence of a severe outbreak of cholera on the river steamers which formerly were exclusively used for the transit of emigrants to the various districts of the province, was specially deputed to enquire into the matter. The new rules have been drawn up on the lines of those recently issued by the Government of Bengal, who took action after consultation with the Local Governments concerned, the Chamber of Commerce, and the Tea Associations. On the railway routes from the Recruiting Depots the adoption of a system of telegraphic advices will enable the authorities to prevent congestion of traffic, and a further improvement is the restriction of traffic to the two main routes, one *via* Naihati and Goalundo, and the other *via* Katihar and Jatrapur.—*Pioneer*, May 28.

THE FLORIDA VELVET BEAN.

For the past year or two—says the Editor of the *New South Wales Agricultural Gazette*—a great deal has been written about this extraordinary plant. Mr. Geo. W. Hastings, an orange-grower in Florida State, thus sums up his experience of it in one of the leading American papers, and in view of the introduction of the bean to this Colony his words may be of interest:—

"The cultivation of the velvet bean up to the present time has established the following facts:—For the extreme south, it is the greatest forage and humus producer yet discovered. North of central Georgia, only in exceptionally long seasons will the seed mature. North of the Ohio River, it will make large growth of vine and leaves but will not come to bloom.

"It is a great fertiliser for orange groves, but its use is not advisable after the groves come into bearing, as the vines are a habitat of the pumpkin (stink) bug, and on the decay of the bean this pest goes to the orange, puncturing the fruit, and causing it to fall.

"As a rule, the velvet bean is not the equal of red clover or the cowpea, either for seed or forage, north of the Gulf States. For forage and fertiliser it has no equal in the barren sandy lands of the South, where the seasons are long enough for the crop to mature before the coming of frosts."

COFFEE NOTES FROM RIO.

The coffee crop of Nicaragua, which is now being gathered, is reported as yielding only about one-half the usual quantity of berries.

Our advices from one of the interior coffee districts of S. Paulo are to the effect that the growing crop is well grown and of better quality than last year.

A gentleman who was through the new coffee district as far as Ribeirão Preto last week, says the coffee plantations are in splendid condition and are loaded with fruit. The crop will be a very large one. Commenting on an estimate in the papers of two millions bags, one gentleman in that locality said it was more likely to be six millions. Ten years ago the country was quite new and few coffee trees were to be seen; now said our informant, the whole country is covered with splendid coffee orchards and trees are just reaching their best bearing age.—*Rio News*.

TEA IN AMERICA.

New York, April 26.

Invoice trading quiet and jobbing demand light. Low grades—in fact, all grades—rule steady, with greatest firmness in the lower qualities.

The English market is very firm, and all teas under 9d are in active demand, while better grades of Indian and Ceylon are irregular. The London deliveries in March were 13,149,228 pounds Indian, 7,310,692 pounds Ceylon, 352,170 pounds Java, and 2,558,122 pounds China—a total of 23,370,212 pounds, against 22.807 862 pounds in 1898. From June 1 to March 31 the deliveries were 224,008,936 pounds, against 218,197,969 pounds in 1897-98. Stock, April 1, 84,769,343 pounds, against 94,580,033 pounds at same date last year.—*American Grocer.*

DR. JOHNSON AND TEA DRINKING.

The following interesting note appears in a recent number of "Notes and Queries":—The use of tea being restricted by its costliness (generally from 3*l.* to 6*l.* a pound) to a limited number of persons, it became a very fashionable drink in the times of the later Stuarts,* and some of this feeling remained in the Doctor's time. Tea was then virtually a monopoly of the East India Company, and the tax upon it varied from 50 per cent. upwards. Hence the loss of our great American colony; hence too, from the exigencies of its price, the minute size of the Johnson teacups still to be seen at Lichfield. Neither was Johnson remarkable for his capacity in tea-drinking. Bishop Gilbert Burnet drank twenty-five cups in a morning, and the poet Cowper was also addicted to frequent libations of tea, in and one of his letters to Hill puts on record an adroit serving-man

"raising the teapot to the ceiling with his right hand while in his left the teacup, descending almost to the ground, received a limpid stream, frothing and foaming on reaching its destination into a roaring syllabub,"—

evidently a waiter, who would have regarded with contempt a modern (air-valve) self-pouring or motionless teapot.—R. B. Upton.

CONDITION OF THE BALATA MARKET.

The output of Balata in Venezuela is on the increase, while that in the Guianas is declining. As an indication, the following comparison may be made of the total arrivals at Rotterdam for the past two years. Though the totals do not vary much for 1897 and 1898, but the percentage received from Venezuela in the latter year was more than double that of the former. The figures denote pounds:

	Surinam sheet.	Venezuela block.	Total.
Arrivals, 1897	337,370	160,600	497,970
Arrivals, 1898	168,960	349,360	518,320

The United States minister to Venezuela reports to his government that up to date Balata has been the main product from the lands of the Orinoco Co., Limited, an American corporation with $30,000,000 capital, who have begun the development of Venezuela, having headquarters at Santa Catalina, on a tributary of the Orinoco.

The *Deutsche Gummi-Industrie* (Dresden) in its issue of March 20 printed this report from Rotterdam: "We would call your attention to the fact that the price of Balata, which has been very low for the past two years, threatens to rise to a very high point. The production in Surinam during the past season was, as is well-known, materially lessened, and will be still more lessened during this season. Reliable reports inform us that the principal *concessionaires* have engaged only one-half of their former employés for this season, and that the smaller producers have been compelled to stop altogether, owing to unprofitable prices. The arrivals of sheet Balata [Surinam], which showed a decrease already in the past year, do not promise any increase for this year. The production of block Balata, on account of the favorable weather conditions in Venezuela during the last season, was very good; how it will fare in the present season and how it will be affected by prices, can at present not even be conjectured. The consumption of Balata, like that of India-rubber and Gutta-percha, is continually increasing; its cheapness and easy working qualities have in a great measure led to the invention of new compounds likely to create additional fields for its usefulness. Stocks are at present very small. As regular imports cannot be expected until the middle of April or the beginning of May, it would be advisable to secure the needs for the present season without delay."

LIPTON, LIMITED.

THE FIRST REPORT TO THE SHAREHOLDERS.

The report of the directors of Lipton, Limited, for the period ended March 11 last states that the profit earned by the company since its incorporation amounts to £217,620, from which has to be deducted the following amounts already appropriated: Interest on debenture stock to March 11, £17,795; interim dividend on preference shares up to September 30, 1898, £22,063; interim dividend on ordinary shares for first half-year, at the rate of 10 per cent. per annum, paid October 15, 1898, £44,018; dividend on preference shares for half-year ended March 31, £25,000; total, £108,877; leaving a balance of £108,743. The directors recommend this balance should be dealt with as follows: To reserve fund, £45,000; in payment of a further dividend on the ordinary shares for the second half-year ended March 11, 1899, at the rate of 12 per cent. per annum (making, with the interim dividend, 11 per cent. for the year), £59,351 leaving a balance to be carried to next account of £4,391. The sum of £44,261, being profits, less interest to vendor, earned prior to the incorporation of the company, has been placed to capital reserve account. The trade done by the company during the past year has been very satisfactory and progressive. The shareholders will have observed that the sale of wines and spirits has been added to the business. This new department has involved very considerable expenditure, which has been charged to revenue. Many impediments and difficulties had to be overcome; but the directors are pleased to be able to report that the department is now in full working order, and they have every confidence it will become one of the largest and most important branches of the business. The directors have obtained 220 licenses in connection with the company's branches throughout the country. The extension of the cocoa factory has now been built, and is being fitted up with the requisite mchinery. The additional factory connection with the preserve works is also nearing completion, and the directors anticipate it will

* Pepys first partook of it 25 Sept., 1660: see also an article on 'Tea-drinking' in *Temple Bar* of April, 1898.

be ready for occupation and in full working order for the new season's trade.—*H. and C. Mail*, May 12.

NO DIRECTORS RESIGN.

An official contradiction reached the *Daily Mail* on Saturday May 6, to the effect that there was no impending resignation from the board of Liptons, Limited. At the same time, it was admitted that considerable friction had taken place while discussing the dividend, and that one of the directors went so far as to threaten to resign if his views were not adopted. His opinion, we believe, was that a bigger dividend should have been paid. However, the ultimate declaration was the result of unanimous concord, so that we shall probably hear no more of the matter. It is hoped that the meeting will be held on Thursday, May 18th.

PRODUCE AND PLANTING.

THE POSITION OF THE TEA INDUSTRY.—After the doleful rumours about the tea industry current six months since, the majority of the recently-issued reports of companies are not so depressing after all. There have, of course, been disappointments, but things might have been much worse. On the whole, the season's working may be expected to show better results than was at first anticipated. Messrs. Gow, Wilson, and Stanton, who give a list of the dividends announced in their circular, point out that the average price of teas, notwithstanding some recent weakness, is well above what it was at this time last year. Here are some recent results: Alliance Tea Company: Final of 4 per cent, making 7 per cent for year; £300 depreciation; £500 forward. Assam Company; 12½ per cent for year. Borokai: Accounts show a debit of £223. British Assam: 8 per cent for year, and £128 forward. Cachar and Dooars: 3 per cent. for year; £386 forward. Ceylon Tea Plantations: 15 per cent. for year; £5,000 reserve; £5,000 depreciation; £3,908 forward. Ceylon Proprietary: 4 per cent. for year; £121 forward. Carolina: An interim of 2 per cent. Darjeeling: 5 per cent; £884 from reserve Darjeeling Consolidated: 5 per cent. preference dividend to December, 1898. Doom Dooma. 12½ per cent. for year; £4,986 forward. Eastern Assam: Five shillings per share; £2,098 forward. Galaha. 4 per cent for a period of eighteen months; £1,000 to reserve; £173 forward. Highland: 5½ per cent; £125 written off new clearings; £70 forward Imperial Ceylon: 4 per cent.; £42 forward. Indian Tea of Cachar: 1½ per cent.; £118 from reserve fund. Jhanzie: 5 per cent. for the year on the ordinary shares, and the proportion payable on the contributory shares: leaving £301 to carry forward. Lebong: 10 per cent. for year; £2,000 from reserve; £297 forward. Mazdehee: Reports show a deficit of £681. New Sylhet: Preference dividend paid, and £18 forward, Nuwara Eliya: 6 per cent.; £300 sinking fund; £2,000 estates purchase account; £1,609 forward, Poonagalla: 4 per cent.; £164 forward. Ragalla: Preference dividend paid; £64 forward. Scottish Ceylon: 10 per cent, for year; £456 forward. Standard Tea Company: 15 per cent. for year; £1,000 depreciation; £644 forward. South Wanarajah: 5 per cent. on ordinary; £400 written off; £56 to reserve. Sunnygama: 3 per cent. for year; £95 forward. Sylhet Company: Nil.

GIFTS WITH TEA.—The gift system in connection with the sale of tea has been carried to such lengths that there is no room left for astonishment as to the nature of the devices employed. But presumably these schemes pay or they would not be persisted in. "The Grocer" gives an extract from a circular issued on the subject, which runs:—"On behalf of my mother, the widow of the late——, I am pleased to inform you, in reply to your note, that she regularly receives her pension of 10s. weekly from——as stated on the bills. My mother had been taking ½lb. of tea weekly when my father died last——, and immediately upon receiving evidence of the death and regular purchase of the tea the first cheque was sent, and since that time a cheque for 10s. has arrived every Saturday morning. My mother is over seventy years of age, and we can never be sufficiently thankful that her remaining years are thus rendered independent. The family would never have allowed her to want; but, still, this 10s. of her own gives her many little comforts, and she often says, 'Thank God for——and Co.!'"—*H. & C. Mail*, May 19.

THE OUTLOOOK FOR COCOA BUTTER.

At the monthly auction sale of cocoa butter in London on Tuesday last the eighty-five tons of Cadbury's which were brought forward realized an average price of fourteen pence and one halfpenny per pound, which is a slight advance over the price paid at the April sale. On the same day at the Amsterdam sale, some seventy tons of Van Houtens and a few tons of miscellaneous brands were secured by puchasers at figures that averaged the equivalent of about twenty-six cents in American money, a trifle less than was paid at April Amsterdam sale. What caused the advance in London is not yet known, the cables simply giving the prices paid.

For the first three months of this year bulk butter was in very strong shape, under the influence of a heavy consuming demand. Indeed, some holders confidently looked for a 40 cent market, and that their hopes were not realized was probably due to the large offerings at the monthly sales abroad. About the beginning of last month the demand eased off, and this, in connection with continued heavy offerings of butter at the auctions, has tended to weaken the market to the extent that the majority of holders would sell at least one cent lower than they were willing to do thirty days ago. The quotation for bulk in the local market today is thirty-one to thirty-three cents, according to the brand and holder. No advance in these quotations can be expected until Autumn, unless the price of cocoa beans should violently increase or an abnormal demand for butter set in during the Summer months, neither of which is likely. On the other hand, a tagging market until August or September next is not improbable, in view of the fact that the consumption of chocolate is at its lowest ebb during the hot water. Stocks of both domestic and foreign in this market are in strong hands, but are not small, and most confectioners seem to have already anticipated their limited wants for the next month or two. Cakes in twelve pound boxes, for druggists' use, are at present ruling firm at a slight advance over bulk, but may be expected to follow the latter in any price fluctuations which occur.—*Oil Paint and Drug Reporter.*

BOGAWANTALAWA AS A TEA DISTRICT.—Referring to our editorial of recent date, a Bogawantalawa planter writes:—"As a matter of fact I fancy this district is very much up-to-date with manufacture and manuring. We nearly all have good cool fermenting rooms and get good flavour; but our teas are *thin* in the cup! We lack the body they get in the Agras, for instance. I fancy our soil is not so good, and when *thin* flavoury teas are not in demand, our prices all come down with a rush, as they have done just lately. And the finest have fallen far more lately than the medium, owing to the heavy fall in fine to finest broken orange pekoes,"

PLANTING NOTES.

TEA CULTIVATION AND MARKET.—An experienced planter writes:—"I see your evening contemporary in one of his leaderettes writes that our old tea bushes are more sensitive to changes of weather than young. Well, that is quite opposed to the general opinion. When the bushes have their tap roots well down the trees are less sensitive to such changes than in the young state of growth. The Colombo market is very sensitive to adverse circumstances. Let the London market go down ½d, it will go down three cents. A scarcity of freight is also made an excuse of buyers slowing off Except for Australia and direct shipments to Continent, the Colombo market is not to be relied on."

PRESERVATION OF RUBBER TREES IN THE CONGO FREE STATE.—The Government of the Congo Free State, with the object of preventing the threatened destruction of the indiarubber trees in that country has promulgated a decree by which it is provided that for every ton of rubber yielded annually, there shall be planted not less than 150 trees. A bureau of control of rubber forests is created, and is charged with the enforcement of the decree of 1892, which prohibits the gathering of rubber in any other mode than through incisions in the bark. Infractions of this new decree, which bears date of January 5th, 1899, are punishable by a fine up to 10,000 francs (£400) or imprisonment. Employers and directors of corporations are held personally responsible for the acts of their subordinates. Guide books for the cultivation of rubber are furnished by the District Commissioners on request, and agricultural inspectors will be placed temporarily at the service of private owners. —*Journal of the Society of Arts*, May 5.

RUBBER IN BRITISH NEW GUINEA.—In the discussion on Sir Wm. MacGregor's paper before the R. C. Institute, Mr. H. A. Wickham said :—

With regard to the resources of the Possession, I may mention that for thirty years I have had experience in tropical work, and I must state, even with so little time at my disposal, that, in my opinion, the most promising product likely to be of commercial value from New Guinea is india-rubber, particularly of the Para variety. In this I speak advisedly because so far back as the '70's, under the initiative of Sir Joseph Hooker, I introduced this variety for the Government of India with satisfactory results. In fact nearly all tropical products are capable of being grown in the Possession of British New Guinea. In no tropical country with which I am acquainted have I seen so many varieties of sugar-cane, and so many indigenous varieties of banana. Tobacco of very fine quality is grown, and there is a native ginger superior to any grown even in the Western tropics. The cotton, also, is very fine, and there are some fibre plants of excellent quality. These things indicate the nature of the country and the climate and its more promising prospective sources of revenue. Especially would I most strongly urge those in administration to offer every possible facility and inducement for the introduction of the *Hevea* (or Para) indiarubber, which could now be readily brought down by short passage through uniformly warm latitudes. A short time since, passing through the Straits Settlements, I saw trees in the second and third generations from my originals from the valley of the Amazon, looking thoroughly well and at home, and loaded with ripe seed. The *Castiloa* of Mexico and Honduras, and the *Ceara* and the *Ficus* rubbers would find suitable localities, but why use other than the best as now to be obtained?

GENERAL TEA AND INVESTMENT COMPANY, LIMITED.—Registered on May 2, by R Plews, 24, Rood-lane, E.C., with a capital of £10,000 in £1 shares (5,000 six per cent. cumulative preference.) Object, to acquire, sell, and deal in the shares, stocks, and securities of tea and other companies. Table A mainly applies.—*Financial News*.

CINNAMON SALES IN LONDON.—The auction sale of cinnamon, which took place in London, resulted as follows :—

Quantity offered	..	800 bales.
Quantity sold	..	700 bales.

The tone for cinnamon is good and the demand is also good. Cinnamon of an ordinary quality is from ½d. to 1d. per lb. higher. Fine cinnamon and finest qualities are from 1d. to 2d. per lb. higher.

"TEA-MAKING WITHOUT WITHERING ROOM" comes, unfortunately, a little too late in the history of the Ceylon tea enterprise, when nearly every estate has its well-found Factory. Pity Mr. Davidson's patent was not realized ten years ago! It is pointed out, however, that leaf bought at Kadugannawa at six cents a lb. might, during the recent hot weather, be well withered before it reached Colombo. We are shortly, however, to take advantage of Mr. Macguire's offer to inspect the machinery and the whole process of tea-making at the Sirocco Works.

SCARCITY OF RUBBER.—As may be imagined, the universal demand for cycles has caused a similar demand on rubber in its raw state with the result that the export of this material from the Gold Coast has become so valuable to the country that the Government is paying special attention to its growth and cultivation. Hitherto the natives, in their eagerness to collect as much rubber milk as possible, have been in the habit of cutting down the trees, instead of only gashing them, so in order to prevent this waste only those natives holding licences from the Government will in future be allowed to work.—*Pastimes*.

TEA MANUFACTURE IN THE CAUCASUS.—The Russian *Official Messenger* gives some interesting details of the attempts that are to be made in the Caucasus to develop the local tea industry. A tea factory has been started by the authorities near Batoum, and machinery of the latest type, as used in India and Ceylon, has been ordered from London. The paper states that Russians prefer Chinese teas to those from India and Ceylon, and accordingly every effort is to be made to produce an article as much like the former as possible. With this view experts have been invited from Central China to assist and advise the local grower.

TEA?—OR MANURE?—A well-known Colombo buyer sends "A specimen of fine (!!) tea plucking, which is certainly a credit to the estate concerned." "This choice lot," he remarks, "is to be offered in next sale and is certain to be bought by natives and eventually hawked in our harbour under some such description as 'specially selected pure Ceylon tea.' It certainly is tea, but it ought never to have left the bush, or, if plucked, it should have been buried as manure. Where is the Health Officer? The tea may fetch 5 to 10 cents per lb. It requires an expert (in manure) to value such stuff." For ourselves we may say we have never seen such coarse-plucked half-fired rubbish.

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis (Para Rubber).—Orders being booked for the coming crop available in August and September. This is the only crop of seeds in the year. All orders should reach us before the end of July to avoid disappointment, as we have to make arrangements in time; guaranteed to arrive in good order at destination. We have already booked a large number of orders. A Sumatra Planter writes, dating 9th March, 1899:—"I consent to the price of £——per thousand. I herewith order 50,000 upon condition that you guarantee at least 33 % seeds germinating." Plants can be forwarded all the year round in Wardian cases. Price and particulars as per our Circular No. 30.

Ficus Elastica (Assam and Java Rubber.)—Seeds supplied by the pound with instructions; price according to quantity. This tree grows equally well in high and low land, in forest and grass land, its cultivation being extended largely by the Indian Government.

Manihot Glaziovii (Ceara or Manicoba Rubber).—Fresh seeds available all the year round; price as per our Circular No. 31. It is superior to Mangiberia rubber and second to Para rubber.

Castilloa Elastica (Panama or Central American Rubber).—Seeds and Plants supplied; price and particulars as per our Circular No. 32.

Urceola Esculenta (Burma Rubber) and **Landolphia Kirkii** (Mozambique Rubber).—Seeds and plants, both are creepers.

Cinchona Seeds.—Different varieties.

Hybridised Maragogipe Coffee.—A larged-beaned superior variety of Coffee in demand; seeds.

Santalum Album (Sandlewood).—The cultivation and felling of the tree is entirely under Government monopoly in India, Sandlewoods to the value of over £100,000 being annually exported to various countries from India. The cultivation of this useful tree is now receiving increased attention in other countries; seeds and plants.

Eucalyptus Marginata (Jarra).—Large quantities of this most valuable timber are being annually exported from Australia to London and various parts of the world for street paving and other purposes. Price of seeds on application. 7,846 pieces of Jarra timber has already arrived for Ceylon use.

Seeds and Plants of Cinnamon, Nutmeg, Clove, Kolanut, Pepper, Cardamom, Vanilla, Arabian, Liberian and Maragogipe Coffee, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign Countries for 1899-1900 are now being forwarded to applicants in different parts of the world.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

A leading Planter writes from *New Hebrides* under date 17th January, 1899:—"I shall like a few more of your Catalogues to distribute through these Islands, as I feel sure many would place themselves in communication with you, did they know where to write for Seeds and Plants."

Our New Descriptive Price List of Seeds and Plants of Fruit Trees now being prepared and will be ready shortly.

Agents in London:—MESSRS. P. W. WOOLLEY & Co., 33, Basinghall Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address:
WILLIAM, VEYANGODA, CEYLON.
Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
HENARATGODA, CEYLON.

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Correspondence.

To the Editor.

RUBBER—ITS CULTURE AND PREPARATION IN TRINIDAD, &c.

Botanical Department, Trinidad, April 24.

To Editors "Tropical Agriculturist."

GENTLEMEN,—I note a reprint in *T.A.* which would probably have escaped notice, had I not been a reader of your periodical. As it was noted in your publication, it is due to you that I should send my reply to you also, and I trust therefore you will give the enclosed insertion, and Mr. Biffen is, I know, a friend of your Mr. Willis.—Yours faithfully,

J. H. HART.

RUBBER COAGULATION AND SEPARATION, &c., &c.

SIR,—In the *Tropical Agriculturist* for March 9th, I find an article by Mr. R. H. Biffen, copied from the "Journal of the Society of Arts," treating on the above subjects.

The writer exhibits a tendency to decry similar efforts as his own, and he uses extracts from the *Trinidad Bulletin* in a way to mislead those who have not that publication in hand; as he refrains from quoting the authorship of the articles. He should have told his readers that Dr. Ernst of Caracas was responsible for the statement he quotes as being "incorrect," and not the editor of the *T.B.* as he leaves it to be inferred for reasons of his own.

After discussing the value of rubber prepared in various ways, Mr. B. jumps to the conclusion that Dr. Ernst is wrong in stating that "smoked rubber is impregnated with impurity," and decides the fact by the prices realised by certain qualities on the larger markets for this class of produce. Now! I happen to have an estimate of rubber prepared without smoking *(Hevea)* given by respectable dealers on those same markets, who valued it as being quite equal to the best smoked rubber, so that a reliance upon this method of estimating quality is proved unsafe, and it may well be that, later on, when buyers have become accustomed to it, pure rubber will sell at higher prices than the smoked product.

Equally unsafe is Mr. Biffen's statement that the juice of the Moon-flower is "alkaline," for I have a qualified analyst's certificate that fresh juice sent by me was found "slightly acid." Equally fortunate is Mr. B.'s assertion that Castilloa *latex* will not coagulate by the addition of acid, as it has been found to coagulate by the addition of acetic acid (Biffen in Ann. Bot. pp. 165 et seq).

The point of Mr. Biffen's conclusions in his article in the Annals of Botany is "that the cause of coagulation must be looked for in the medium in which the rubber particles are suspended," but unfortunately for this theory it has been abundantly proved that not only can rubber be coagulated when the albumenoids are removed, but a better class of rubber produced.

An attempt follows to ridicule the statements as to the character of land suitable for various rubbers, and accuses us of "slight confusion" in the *Trinidad Bulletin.* As a matter of fact the statements are quite sound, and the confusion only exists in the writer's brain. *Hevea* will grow well in places never inundated, notwithstanding the fact that it is found in places regularly flooded, and this can be proved by trees growing in Trinidad, which have been found to stand drought with impunity, and have never been flooded.

I can well afford to pass without irritation the remark made on my supposed "re-discovery" of a method, for the method differs so much from that described by older writers, that it cannot be placed in the same category. It is a method of washing, in it is true, but a very different method to any formerly described, in fact may well be compared to the washing of the steam laundry as contrasted with that of the peasant at the river side.

Notwithstanding what is said by "Le Caoutchouc" (p. 6) rubber prepared by this process is of the highest quality, as it is found possible to rash it quite free from *corps étrangers.*

Mr. Biffen claims that his machine separates the rubber particles by centrifugal action, but the real fact is, they are brought to the surface by *centripetal,* not centrifugal action.

The insertion of the word (*sic*) might also have been readily avoided by the writer, had he noted that the word "or" should have been substituted for the word "and."

I now come to a remarkable statement where Mr. Biffen says that research work should tend "to prepare rubber free from the other constituents of the latex." How this is to be reconciled with the previous *dictum* of the Annals of Botany is not quite clear. It there says "The action of centrifugal force effects the separation of the rubber, and from the failure of the processes usually employed, involving the use of chemical re-agents to bring about the clotting of the separated and washed rubber particles, we must infer that *the cause of the coagulation must be looked for in the medium in which they are suspended.*" Again we are told that "the coagula in forming gather up the rubber particles" . . . . "in the same way as the white-of-egg gathers up particles in suspension when clotted for the purpose of clearing jellies."

It must be concluded therefore that Mr. Biffen has abandoned the position he formerly took up, and is now devoted to the task of removing those very constituents he formerly stated were essential to coagulation, but which he at the same time proved could be dispensed with, for he told us that they could be "brought into a solid mass by pressure, by heating and by evaporation (Ann. Bot. p 168). Why does he use the words "brought into a solid mass"? and not the word coagulation?

Mr. Biffen records his success in preparing rubber by a physical process. He started by requiring albumenoids for coagulation, but now he is recommending separation by a physical process; and has adopted what is actually the basis of the hydro process, which he facetiously accuses me of having rediscovered. I might with equal propriety ask him whether he re-discovered the Babcock machine. If I re-discovered! so has he. I separate by water, he by physical methods, but I dry by evaporation! so does he. His rubber is free from impurities! so is mine. His method requires a machine, so does mine. Again his rubber is free from smell, so is mine, and large quantities can be prepared in a day by simple apparatus, while it would take a powerful engine to drive the machine to get through a similar quantity by centrifugal action. The quality of my rubber is equal to that prepared by other physical processes, as a voucher for which I am quite prepared to submit samples for test and the "*merits or demerits of the system*" do not rest with me, but with those who can judge of its value by actual practice; Mr. Biffen states the contrary.

Mr. Biffen repudiates statements made in Trinidad, but no one has asked him to be sponsor for them. He must however allow me also to repudiate the points conveyed by his remark that "a copy of his machine was exhibited without his consent or knowledge." As a matter of fact the machine was no "copy," any more than his primary effort was a "copy" of the Babcock; but was of different construction, and a vast improvement upon his model, as he knows, for drawings of the improvements were placed in his hands. The "Babcock" machine was never patented, and there are consequently many modifications of it, among which are the forms under discussion which can hardly be called inventions, for such adaptations are being made daily all over the world, for the separation of materials of different densities.

I may be liable to a protest from Lefebre for pirating his ancient washing method, I may perhaps expect a raid from Central American Indians for

having improved on their use of the juice of the Moon-flower; or I may be called to account forusing a modified form of butcher knife for sticking a rubber tree; but I hardly thought I should be held responsible for having with others used the principle of the "Babcock" machine.

There is a point which I would commend to Mr. Biffen's attention, and this is the special character of the Rubber globules of *Castilloa*. Perhaps if he examines them he may find the cause of the rupture which is evidently the real cause of coagulation. This rupture can be caused in various ways, and he who succeeds in causing it in the simplest and most economical way will have solved the question of the preparation of Castilloa rubber, be it by a physical or *non*-physical process.

April 21st, 1899. J. H. HART, F.L.S.

TIMBER TEA CHESTS COMPANY, LIMITED.

(The Colindia.)

22 Fenchurch Street, London, May 5.

DEAR SIR,—I am directed to enclose for publication a report just received from the Colonial Tea Warehouses, bearing upon the condition of the Colindia chests arrived from Ceylon. Last mail we handed to your London correspondent copy of the brokers' report. We are now shipping the chest in large numbers as the orders are coming in most satisfactorily.—Yours faithfully,

THE TIMBER TEA CHESTS Co., Ltd.
T. W. Ricksby, Secretary.

Copy of letter from Colonial & Granite Wharves, London E.

Re—93 chests tea marked "Belgravia" ex "Staffordshire" 2nd inst., packed in the new "Colindia" packages.

We have received and weighed 90 of the above and as requested a careful examination of the condition (external) has been made.

The packages are sound and intact, not a leakage showing anywhere, the nails and clamps being quite firm, there are a few splinters, showing signs of a heavy weight having being dropped on packages but in no case any damage occurred, and we feel quite justified in stating that this is the best package of its kind we have yet handled.

We find the gross weights are exactly even all the way through, not varying by a single pound and this with an even tare is of great importance as it will enable us to turn out the full net weight.

We understand that one chest not yet to hand has been roughly handled in ship which necessitates cooperage before we receive it, this paokage we will write to you about later.

Another consideration with these new packages is, that they need not to be opened for the Brokers' inspection but simply bored; which practically leaves the chest as it arrived.

"THE JUNGLE CROW."

Hakgalla, May 7.

DEAR SIR,—It is a fact that the "Jungle Crow" nests and rears its young in the trees in this garden. Yesterday morning a young one was found at the foot of a large *Araucaria* tree. It had apparently got out of the nest before it could fly properly, and one of the coolies caught it.

I sent my son up the tree to find the nest, which he did in the thickest part near the top. The nest was rather untidy. The bottom part was of twigs, something like a rook's nest, with lots of dirt like "wormcasts" among them. It was oval in shape, with a sort of hood on one side, and lined with leaves. The young one makes a noise like a young owl. It eats lizards and frogs, but rejects beef.

I think there were two young ones, as I several times heard the same sort of noise as the one we caught makes; but it was concealed in the tree, and I have not been able to catch sight of it. The old jungle crow was fidgetting about all day and seemed much troubled at the loss of her young one.—Yours truly,

W. N.

THE WESTRALIAN EXHIBITION AND CEYLON TEA IN AUSTRALIA.

Coolgardie, Western Australia, May 8.

DEAR MR. EDITOR,—The Ceylon tea-room has, as, I anticipated, done an immense deal of good. It has opened the eyes, not only of West Australians, but of many of our visitors, to the fact that these colonies, where tea is consumed in such enormous quantites, have been and are *poisoned*. It has been my hobby for many years—and your dear old senior and I had many talks about this opening up of the Australian trade. The time has come to do it. I have written by this mail to Mr. Lane and I want you to help me in carrying out the scheme.

I am tired of Exhibition work—this is my jubilee one; 50 Exhibitions! I have my youngest daughter married at Fremantle, a son in Perth, the others—seven —scattered over the eastern colonies—all doing well. I would pitch my camp in Perth, have a depôt here, and through my sons open up others in Melbourne, Adelaide, Sydney and Brisbane. The great thing is to have in Ceylon some expert to mix or blend the teas so as to ensure a constant supply of *one* sample of each grade—cheap, medium, good, and superior—being four prices—the first, of course, will command a huge sale.

The great and more important matter is to be able to rely on a supply: that the demand exists there is no doubt, and that we could soon increase the present trade I am confident, provided it be done systematically and well.

I would gladly undertake this and even forego the offer I have to go to the Paris Exhibition of 1900. As I said I am tired of Exhibitions. I need rest, but not idleness. This tea racket would suit me, and if the tea planters are willing I am "on the job." So satisfied am I of success, that I am willing to be paid by results, if they will guarantee *working expenses* as a first call or profits, of say £200 or £250 a year. Colombo is only a few days from here. I might, if need be, take a run across. But it is hardly worth while encountering even one day's *mal de mer* and I am an awful bad sailor.—Yours very truly,

JULES JOUBERT,
General Manager, West Australian Exhibition.

ANALYSIS OF COPRA (KERNEL OF COCONUT PALM).

City Analyst's Office, Colombo, May 17.

DEAR SIR,—In reply to your French correspondent at Reunion, who wished to have a fuller analysis of copra than he found in my Manual of Chemical Analyses, I have not had occasion to make any fuller analysis; but as coconut poonac is simply copra after the greater part of the oil has been expressed, the composition of the latter can be calculated from the analysis of the former. If we regard a good sample of copra as containing 67 per cent oil, and taking the moisture at about the average of 6 per cent, the composition of copra would be represented as follows:—

COMPOSITION OF COPRA.

	Per cent		Per cent
Moisture ...	... 6·00	Carho-hydrates ...	15·21
Oil ...	..67·00	Woody fibre ..	2 11
Albumenoids	... 6·69	Ash	2·99
		Total	100·00

The nutrient ratio, and the nutrient value, of copra such as above, calculated in the usual way, would be 127·3 and 189·4 respectively.—Yours truly, M. COCHRAN.

"FACILITIES FOR MAKING GOOD TEA."

London, May 19.

SIR,—Your notes on the above subject are very interesting.

The ventilation of the subject of manufacture and the procedure in different districts will have the advantage of undoubtedly improving the quality in many places. The majority of planters in India and Ceylon have made up their minds, "*let's hope*" to sacrifice quantity to quality, and every effort should now be made to put a good class of tea on the market and not to be alarmed at the bogie of the cheap teas that are to be shipped from China.

With regard to withering accommodation, very few factories are in a position to keep their leaf properly thinly spread for more than a couple of days when there is a rush of leaf coming in—so that the leaf has to be made into tea ready or not—and the result is inferior tea. A neat and compact withering process is a great desideratum—and if not too expensive would pay for itself on a large factory in one season. One of the greatest deficiencies is in rolling power.* It is quite accepted as a necessity in India to roll the leaf thoroughly twice for 15 to 20 minutes each time according to the condition of the leaf. The last rolls take place after oxidation—and the leaf is taken straight from the roller to the driers—yet, how many factories are there that can carry this rolling out thoroughly on a heavy day? Tea-rolling machines are now made much cheaper than formerly and requires but little driving power, so that there is but little excuse for any factory not to be provided with ample rolling accommodation, which is such an important process in manufacture. A new system of drying tea by steam has many advantages, especially for final firing and packing. J. H. H. K

* A rolling machine for every 100,000 lb. of tea made as stated by your correspondent, is an absolute necessity.

CEYLON TEA IN AMERICA.

Kandy, 23rd May.

DEAR SIR,—If Mr. Pineo is not on the "Thirty Committee," do not you think he should be asked to stand. His vast experience in America in pushing our staple, added to his well-known business capabilities, should prove of the utmost value to our local men.—Yours faithfully,

TEA

[We think Mr. Pineo is admirably qualified to serve, if he is willing.—ED. *T.A.*]

INDIAN "GREEN TEAS."

SIR,—One can scarcely take up a commercial paper without coming across complaints from Consular reports and elsewhere of the fatuous, and to themselves ruinous, stubbornness of *home* manufacturers in refusing to manufacture and pack their wares to the wants and requirements of foreign buyers. It almost seemed as if "this hidebound Toryism refusing to stretch an inch until it burst," was entirely confined to the home manufacturers; but judging from a letter of Commissioner Mr. Mackenzie, the Ceylon planter also considers himself the best judge of what his customers ought to take! On page 804 of the May issue of the *T. A.* occurs the following para:—

Greens.—In Mr. Blechynden's report to his Committee he says about *unfermented teas*:—"Some samples of these Oolong teas made in India were sent me early this year. They were found so suitable for the market, and firms were so ready to give immediate large orders that I have had to revise my opinion. I now believe that there are certain districts in India, where Oolong teas of a character to command a ready sale can be made, and if such teas are produced *there is practically no limit to the business that could be done*," *etc.* Those Indian greens, I mentioned in my letter of the 14th were picked up at once.

DIMBULA TEA PLANTER.

[Our correspondent should quote the rest, namely:—

Unfortunately there were only a few hundred cases, whereas thousands could be sold. These could be sold easily, whereas our blacks *for price* are unsaleable being too dear. An Importer bought some Ceylon greens lately. He has twice told me the people to whom he sold them could not get rid of them—as they were good and pretty, but different from the kinds used here. These people have *now* wired to him to reserve for them any other similar Ceylon greens he could get.

Mr. Mackenzie's letter is dated March 20th last: have there been favourable sales of Ceylon Oolongs in New York since then?—ED. *T.A.*]

MANURING COCONUTS.

DEAR SIR,—Mr. Beven's report on this subject in your paper of April 19, is both interesting and instructive. I beg Mr. Beven to give us the following information.

1. Of the trees experimented, how many are there to the acre?
2. Are there any vacancies?
3. Are there any young plants in those vacancies?
4. If so, how old are those plants?
5. How much does the manure cost to reach the estate?

6. How much does it cost to put it to the trees?
7. Do you plough or hoe down the manure?
8. In hoeing or ploughing how deep do you go?
9. How far from the root of the tree do you begin hoeing and ploughing, and to what breadth do you do it?

—Yours truly, COCONUTS.

COCONUT PLANTING.

Franklands, Veyangoda, May 24.

DEAR SIR,—In answer to "Coconut" 's letter in last night's issue of the *Observer* I have pleasure in supplying the further particulars he asks for. I may mention that most of the information he wants was embodied in a previous report I sent to Messrs. Freudenberg & Co.

(1) 75 trees to the acre; (2), (3), (4), refer to my report, published in the *Observer* of the 19th ultimo, I now deal with the first and second plots of the five mentioned.

Plot No. 1:—In (A) 32 trees were manured. Besides these there are eight plants—from two to five years old—which were not manured. No vacancies. In (B) 33 trees were manured. Two three-year plants were not manured. One vacancy unfilled. In (C) 32 trees were manured. Two three-year old plants were not manured. In (D) 35 trees were manured. Two plants from two to five years old were not manured.

Plot No. 2:—In (a) of the 72 trees manured, six were not in bearing. Ten vacancies are occupied by plants ranging from two to four years old: these were not manured. In (b) 75 trees were manured, of which eleven trees were not in bearing. Besides these there are 15 plants from two to four years of age, which were not manured.

(5) The transport from the Veyangoda Railway Station to the estate costs 50 cents per cart, if outside carts, less if estate carts, are used. The usual load a cart carries on this road is 17 cwt.

(6) The average cost of digging in the manure round a tree is 1·4 cents per tree.

(7), (8), (9) My mode of application is:—The manure is spread evenly round the tree, three feet away from the trunk, then dug in—three mamoties in width—to a depth of from nine to twelve inches, after which the soil immediately round the trunk is loosened to a depth of two inches. Finally, the fallen branches are cut up and placed over the portion dug in: mulching.—Yours truly.

A. KARL BEVEN.

COCONUT PALM CULTIVATION IN THE STRAITS:

May 26.

DEAR SIR,—I have read with much interest, in the *Selangor Government Gazette* of 5th May, which you kindly sent me, the "Notes on the effects of Sugar Estates in Coconut plantations." As there are no sugar estates in Ceylon—the small areas of canes at Baddegama near Galle are, I believe, grown at intervals of several years, rotation of crops being the rule—it cannot be determined what effect growing sugar canes would have on coconut estates in the vicinity. So long as the megass is burnt, and the decaying nobs of the canes dug out and burnt, I cannot imagine what possible effect it can have one way or another. What strikes a Ceylon coconut planter at once is the enormous number of rhinoceros beetles there must be in Selangor and other Straits Settlements, and the great havoc they commit, compared with the, comparatively speaking, small number in Ceylon and their practical harmlessness. What is the cause of their great numbers, and why are they so edstructive in the Straits? Can the beetle be of a different species with different habits from the Ceylon one? The conditions for the breeding of the beetles—stable and cattle-shed refuse, and heaps of decaying vegetable matter—must be pretty much the same in both countries, so those alone cannot account for the larger numbers in the Straits. I am inclined to think that the land in the Straits is richer in humus and vegetable matter and thus affords more food for the grubs. I see that they are said to be worse in "bakan" land; what is "bakan"? I gather that whatever it is, it is very rich in vegetable mould, and in this, of course, the grubs thrive. Why the rhinoceros beetle should have acquired different habits and become more destructive in the Straits than it is in Ceylon I am not in a position to say; perhaps different local conditions, and variation, by natural selection, for its preservation? In Ceylon the rhinoceros beetle rarely attacks coconut plants before they are two to two-and-a-half years old, and then all the mischief it does is to work its way down to the tender portion of the centre leaf which it eats into till stopped by the hard midrib. When the leaf opens out it looks a little ragged and that is all: it never kills a plant. So little harm does it do to the coconut plant that for many years I have ceased to have them killed, deeming that the spearing does more harm to the plant than the beetle! It is possible that cases may arise, but I have never yet seen one, where a field of young plants may be badly infested with the beetles when, of course, it would be necessary to kill them with the barbed spear; but care should be taken when so doing to tamper as little as possible with the plants. Long may the rhinoceros beetle in Ceylon be as inoffensive as he is at present, and may he never develop the destructive propensities of his relative in the Straits Settlements. Our enemy is the dreaded red beetle, and against it we wage vigilant and constant war. W. J.

ORCHIDS IN FLOWER AT THE ROYAL BOTANICAL GARDENS, PERADENIYA.

June 1.

DEAR SIR,—Local admirers of orchids may be interested to know that the following species may now be seen in flower in these Gardens:—

Renanthera coccinea ("Chinese air plant").—A climbing epiphytal species, native of Cochin China, and said to be introduced to Peradeniya in 1884. A plant of this which was last year placed against a Cassia tree near the Orchid House has thriven well since, being now 7½ ft. high, and forms a striking object on account of its deep crimson inflorescence. The latter is a flattened form of panicle, nearly 3 ft. long, spreading horizontally, and bearing about 130 flowers. Flowers erect, about 3 inches in diam.; petals and dorsal sepal narrow and strap-shaped, orange-red spotted with crimson; lateral sepals large, oblong-spathulate, wavy, lobed at the base, dark-red ground, with blood-red blotches which appear velvety and raised; lip (labellum) small, 3-lobed pale yellow, red-tipped, inner side streaked with dark red, stem cylindrical, sending out numerous aerial roots which attach themselves firmly to the supporting tree. Leaves oblong, four to five inches, leathery and stiff. The flowers last for several weeks unless damaged by wind or rain.

Cattleya maxima var. *Peruviana.*—One of the several varieties of a species which represents a genus almost unrivalled, both for beauty and size of flowers. The genus is indigeuous mostly to Central America and Brazil. Flowers very handsome, each 6 inches across; petals and sepals of a rich lilac colour; lip large, with crisped and sinuate margins edged with a paler line, the inner side variegated with violet-red veins, with a pale yellow band in the middle.

Dendrobium nobile.—One of the most beautiful of orchids when in flower, native of China. Flowers 3 inches in diam., in pairs, produced towards the ends of the stems, each pair being opposite to a leaf; thus the green flacid leaves are effectively intermingled with the flowers. Sepals and petals white at base, merging into rosy-pink at the tips; lip large, cup-like, white, tipped with rosy-pink, and blotched in the throat with purple-crimson. Pseudo bulbs 1½ to 2ft. long.

Dendrobium atroviolaceum.—This is now in flower here for the first time, the plant being only introduced last year through Messrs. Sander & Co., of St. Albans, England. Though not strikingly showy, it is a distinctly handsome species. The petals and sepals are creamy white, tinged with yellow and dotted with purple; lip 3-lobed, the side lobes dark violet coloured on the inside; the front lobe being striped with the same colour on a green ground.

Miltonia Warscewiczii, var. *Weltoni.*—An epiphytic orchid from Peru. Inflorescence a panicle, issuing from base of pseudo-bulbs, about 2½ft. long, rather slender and drooping. Flowers nearly 2 inches in diam., petals and sepals very similar, light brown with much crisped margins, white at the tips; lip large, flat, almost circular, undulated, maroon, fringed with pale grey, blotched with yellow at the base and with a shining spot of chocolate colour in the middle, the underside being marked by a semi-circular grey ring.

Eria armeniaca.—This is perhaps the most showy species of the genus, nearly all the others being considered more curious than beautiful. Growing in the forks of a shrub, it sends out several stalks of racemose inflorescence from the base of the short and flattened pseudo-bulbs, each stalk about 15 inches long. The large bright orange red bracts at the base of the flowers are the showy part, the flower itself being rather small and of dull greenish brown colour.

The following among others may also be seen in flower; Dendrobium Jenkinsii; D. moschatum; D. cretaceum; D. sanguinolentum; D. fimbriatum, var. occulatum; Phalænopsis amabilis; P Parishii; Epidendrum ciliare; Lycaste candida, var. Lawrenceana; and species of Oncidium.—Yours faithfully,

H. F. MACMILLAN.

CEYLON "THIRTY COMMITTEE."

CEYLON TEA IN AMERICA.

Kandy, June 9.

SIR,—The enclosed letter from Mr. Mackenzie to Mr. Lane is forwarded for publication as of some general interest.—Yours faithfully,

A. PHILIP.
Secretary, Thirty Committee.

London, May 17.

DEAR LANE,—I have yours of 4th. I have already written to you, mentioning the very sum you suggest as what should be spent in America next year. It would be chiefly in subsidies and demonstrations, as we could not also keep up the advertising with that amount.

When writing to you about what I saw in Germany, I forgot to mention that the indefatigable Yankees have got hold of the banks of the Rhine. Sailing down, one sees huge wooden placards, on the most prominent points of the famous "Castled Crags" with "Eat Quaker Oats" in very large white letters "Nothing is sacred from the sapper" may well be applied to the Yankee. I could not help wishing it were "Drink Ceylon Tea." An investigating Committee has been appointed in the States to enquire into Food Adulteration: some of the evidence is startling. Cheap as coffee is, it is manufactured in large quantities of flour paste, &c., pressed by machinery into the shape of coffee beans. I send two notices with our advertisement on the subject. I have arranged for a large advertisement to appear when tea is examined, provided ours are found pure. In one of the cuttings sent, you will see something about the green colouring matter used in some tea. I enclose one of Finlay, Muir's Seeta Ceylon advertisements. Also a letter addressed to the ladies of Canada by the Blue Ribbon Co. (Galt & Co.)—one of those firms specially induced to help us in Canada last year. I also send you in separate envelope a list of the papers in which they are advertising and copies of the advertisements which are striking. They have sent me a huge box of newspapers with the advertisement, for which I had to pay 10s cartage, &c. One likes to keep an eye on all our friends, and this was their crushing reply to a suggestion from me, that I would like to know what they were doing.

I send also a lot of our advertisements and those of others from recent Canadian Grocer papers, as you said lately in one of your letters that you took an interest in them.

Read the articles in *New York Herald* showing how politics come into every thing, and the lengths in robbery, &c., one may go provided he has a strong political friend.

There is an immense number of things one has to watch, follow and keep in touch with. This is more difficult now, that Blechynden is no longer on the spot and working with us. I may have to go over in June, but I won't unless actually necessary, as I do not wish to put the Committee to the expense. In July and August we will, as last year, practically stop, although correspondence is incessant However, there will be neither salary nor travelling expenses.

I am giving our allies the hint, that "Ceylon" must now be the prominent feature, as "India" has ceased subsidising—although still assisting in advertising.—Yours truly,

(Signed) WM. MACKENZIE.

SIR,—In its Editorial of the 30th ultimo, in *re* "Our Staple and Foreign Markets," the "Times of Ceylon" suggests matter, both seasonable and comprehensive, for thoughtful, deliberate consideration, and all interested in our staple should give heed to it.

My object in now addressing you is for the purpose of again begging that greater concentration of effort be given to the markets of the United States where ground has been broken, but not yet thoroughly cultivated, and from which only a small harvest can, at this stage, reasonably be expected.

The Acting Secretary of the Indian Tea Association declares the operations in America "have admittedly been successful."

This satisfactory outcome is the result of work inaugurated and executed by Mr. Blechynden, who is deservedly entitled to great credit for satisfactory labour performed prior to, and during the opening of, and also subsequent to, the closing of the Chicago Exposition.

Mr. Blechynden was wise to study American methods, quick to accept ideas that gave promise of aiding him in accomplishing his designs; and the success he achieved was, in a measure, due to his power of assimilating what he felt would bring satisfactory results.

Ceylon is now to be congratulated on gaining the active aid and experience of Mr. Blechynden, as his services have been secured by the shrewd, progressive firm of Messrs. Whittall & Co., of Colombo, whose interests he will guide and advance in America.

The plan for the expenditure of the money voted for next year has not yet been disclosed to the public; but it will, doubtless, be largely on lines laid down and recommended by Messrs. Blechynden and Mackenzie, who, it is to be hoped, will not base their plans on a system of subsidies, which system can only be entered upon when guarded by conditions so stringent that no firm of high and honourable standing will care to accept. At best, this system is a poor make-shift affair, vicious in its bearings, and susceptible of great abuse, and ending—usually—in dissatisfaction, loss and calumny.

It may be accepted and recognised as a fact that both the American and Canadian consumer give the preference to Ceylon pure teas, andtake to them more readily than to the teas of India, which are, however used in larger proportions than Ceylon's for blending with and fortifying inferior teas of other countries

My contention is that Ceylon has done but little more than tickle the ground in the United States, and that more aggressive work is demanded; while no thought of decreasing our efforts should—for a moment—be entertained.

A population of 75,000,000 people, increasing steadily and rapidly, cannot be reached without a protracted and vigorous siege. The people who drink tea are not those who dwell in large cities, but they who live in the smaller towns, villages, and country, many of whom use it three times a day, while the majority of them never saw Ceylon tea! How is it proposed to get at this class? The retailer is the only medium that can be used, and he is the one to be helped. If, when granting a subsidy to a wholesale man, it can be arranged that a portion, at least, goes to the retailer,—the latter will have an incentive and will, probably, do good work; otherwise he will have nothing to gain, and much cannot be expected of him. A plan for reaching the real consuming class was submitted by me, but its very simplicity has, most likely, caused it to be received with disfavor, and yet the plan is a good one and can be elaborated and improved upon and made more workable.

Canada is not nearly conquered; but it is fast coming into line.

The lower or Maritime Provinces use nearly six pounds of tea per head per annum, whereas the upper Provinces only consume about three pounds.

The merchants of the Maritime Provinces have begun an aggressive campaign and our interests will be actively advanced by them, but, in the Upper Provinces, and in the Great North West, where large numbers of Russians are now settling, much remains to be done, and this work, we hope, will be conducted, with spirit and energy, by the merchants, who, however, should be assisted in every possible way,that may be considered advisable.

In Mr. Renton's guiding hands we can confidently and safely leave our interests in France, Germany, Austria, Italy, and the lesser kingdoms of the Continent; but in Russia we have much to do, and our efforts should be largely directed to securing a reduction in the duties on tea, so as to bring our tea within the reach of the masses of the people. This must, of course, be done by the aid of the Imperial Government, and through the devious, delicate channels of diplomacy; but it is a matter of vast importance to Ceylon, and hence should be constantly kept in view.

In order to reach the acme of success Ceylon must continue to agitate, be aggressive and, in some form, advertise. Now the principal objects to be striven for in advertising are to attract, impress, convince and convey to the mind something that will long be remembered. Having these matters constantly before us, we must study just what kind of advertisement will be best suited to our purpose, and what mediums shall be used to reach the people we want to capture.

Nowhere is the act of advertising studied with greater fidelity and assiduity than in the United States, where men make it a vocation and give their undivided attention to it, and where they are a highly paid and absolutely necessary part of every establishment that seeks the purchasing public.

Advertising that brings results must be bright, alert, aggressive and constant, and its main object as before stated, should be to attract and so impress the reader's mind that he will remember it. No ordinary advertisement will do this, nor will a lack of persistent effort ever lead to success. Jumping or making a spurt and then easing off will not accomplish anything permanent, and this leads me to conclude my little say by imploring the "Thirty Committee" not to contract, but, on the contrary, to expand and increase its efforts in the United States, where a rich and satisfactory harvest may in time be secured, if cultivation of the ground be persistently conducted and uninterruptedly maintained.

Pears' soap has made a world-wide reputation and can be found in every first-class drug store in the World, and yet its owners go on increasing their advertising expenditure and effort every year, and that, too, in all parts of the globe. In the United States, the Royal Baking Powder Company—long established—spend something like a million dollars a year in advertising and making demonstrations, and yet no Grocery would think its stock complete without this article. Baker's cacao has been known for nearly a century, but the Company spends more and more money every year in advertising, and at the principal Food Exhibits in the country this cacao can be found in its attractive booths. The managers of these profitable concerns know that without constant, increasing advertising effort their business would decrease in volume and in amount. "Our own and only" Lipton's furnishes us with an object lesson, and where can a shrewder or more successful advertiser in modern, up-to-date business methods and management be found?

If we want to succeed we must advertise, and if we advertise it is our bounden duty to learn how, when and where to advertise. Circulars are mediums of waste land, no one in America heeds them. Advertising in the plethoric Sunday papers issued in the large cities of America is absolutely futile, and the same assertion is fairly applicable to the dailies—hence these mediums should all be rigorously excluded from any proposed plan.

As auxiliary to and part of my plan of demonstrations, which may be classed as one form of advertising, Cave's lecture on the buried cities of Ceylon, with its attendant paraphernalia, could be utilized and delivered before Lyceums, Lecture Rooms, and Church Vestrys, where the tea drinking class do mostly congregate during the long evenings of winter; then Ceylon tea would become popularised and known far and wide. Many other forms of useful advertising might be enumerated, but enough for my present contention has already been said.

When we have succeeded in placing 25,000,000 lb. of our tea in the markets of America, then, and not till then, can we lay back and let the merchant, in place of the grower, advertise Ceylon tea.

If, Mr. Editor, you consider this little pipe of mine worthy of space in your valuable journal, please give it room—you will know what to do with it should it, in your opinion, be of doubtful interest to your readers—and if it will in a feeble way arouse the planters, for whom it is primarily intended, some good may emanate from its little wail.—Yours, &c.,

R. E. PINEO.

PROGRESS IN NORTH BORNEO.

Kandy, June 9.

DEAR SIR,—The following facts relative to progress in Borneo are interesting:—The increase in value of Imports 1898 over 1897 is over half a million of dollars; Cloth shows an increase of $88,631; Treasure $81,016; Machinery and Vessels $69,430; Opium happily

shows only an increase of $15,504; Spirits and Wines unhappily $35,601. The above shows that British North Borneo or the New Ceylon is going forward.

As to Exports, if we exclude Tobacco, there has been an increase in the general trade of $267,064 in 1898 over 1897. As regards tobacco, new ground is being taken up, and this discrepancy will probably rectify itself by next year.

Timber shows an increase of $96,427; Cutch, a very progressive industry, $35,706; Gutta and Rubber, $61,700; "Seed" and Mother of Pearl, $20,700; and Copra, quite a new feature, $10,695.

To take the increase of Exports and Imports in the last decade, we find the following to show the "forridness" of New Ceylon:—

1888—Imports...	$1,798,620	Exports ...	$701,433
1898— do. ...	$2,419,087	Do. ...	$2,881,851
Increase ...	$620,467		$2,180,418

To instance another feature in the prosperity of the Colony, one steamer alone, of 7th May, brought for the tobacco estates 182 free Chinese and 425 contract coolies.

I send you herewith a comparative statement of Foreign Exports and Imports during the years 1897 and 1898.—Yours truly,

W. D. GIBBON,

Ceylon Agent, British North Borneo Govt.

CASTILLOA RUBBER.

MAJOR GORDON REEVES' OPINION.

Ratnatenne, Madulkele, June 10.

SIR,—I have not been experimenting again with tapping Castilloa, as I do not wish to injure the seed crop;—though possibly, tapping would tend to increase this as in the case of mangoes, peaches, etc. The tapping which was done to obtain the samples I sent to Liverpool, was carried out in average showery weather. Some Para trees were tapped at the same time, and the superiority of the Castilloa as regards *yield* at once became apparent.

The quantity of dried rubber obtained, or rather the quantity which we took from three trees as a sample, was about 1¼ lb.; doubtless, a good deal more could have been taken, but we did not want more. A tree seven years old may, I understand, be tapped five or six times a year. What we did prove was the fact that, under the same meteorological conditions, on that particular estate, Castilloa yielded *much* more readily than Para, and we at once acted on that discovery. I am sorry I cannot give more definite information as regards yield at the present moment, beyond the fact that Castilloa with us is by far the easier of the two trees to get a yield from; and, probably, therefore, the best yielder of rubber. But we intend to carry out exhaustive experiments later on; and you shall have a memorandum of these and of the results.—Yours, &c.,

E. GORDON REEVES.

CEYLON "THIRTY COMMITTEE."

CEYLON TEA IN RUSSIA.

SIR,—I herein enclose copy of letter received from Mr. Rogivue reporting on the progress made in the sale of Ceylon tea in Russia and also adverting to what is being done in Switzerland.—I am, sir, yours faithfully,

A. PHILIP,
Secretary to the "Thirty Committee."

A. Philip, Esq., Secretary to the "Thirty Committee," Kandy, (Ceylon).

Moscow, 1/13 May, 1899.

DEAR SIR,—I duly received your favor of the 27th February for which I thank you, also your Committee for their kind allowance of £40 towards the cost of my advertisement-cards, in the form of Ceylon views, which I have distributed over Russia. I now beg to inform you that I have this day taken the liberty to draw these forty pounds sterling upon your goodselve at ten days' sight, to the order of Messrs. P. R. Buchanan & Co., London, which I shall thank you to kindly honour on presentation. As regards the progress of Ceylon tea in Russia, I am of opinion that the last Newspaper Advertisements directed by Mr. Christie, under my supervision, have done a great deal of good and the fact that more of Russian Firms' Tea buyers are establishing themselves in Colombo, and that the direct exports of tea from Colombo to Russia are increasing yearly in large proportions, also that the import of Ceylon tea in Russia, through London, and Germany is also increasing steadily,—is the best illustration one can get of the progress the article is making in this country. ——— is right enough when he says that Ceylon Tea is largely used for blending with Chinese Teas, but he is decidedly in error when he affirms that the Russians don't drink Pure Ceylon Tea. Almost all tea merchant in Russia is now selling Pure Ceylon Tea in packets, and I am not afraid of venturing to say that a few millions of pounds are now likewise (pure) sold and consumed yearly in Russia. The bulk of the trade, it is true, being however for blending purposes, because the Russians do not care any more for the weak and tasteless China Tea they are getting now. I was lately in Switzerland when I had the pleasure of meeting my old friend; Mr. Bremer of Messrs. George Steuart & Co., Colombo; he was greatly interested with the work I am doing there for the introduction of Ceylon Tea in Switzerland: where (at Morges on the Lake of Geneva) I have opened an Agency of Rogivue & Co., Limited, for the sale in chests and packets of *pure* Ceylon Tea, which is now gaining great favour in that country. Mr. Bremer will be able to inform your Committee about my exertions in pushing the article there, and he gave me to understand that the Thirty Committee would gladly support me and reimburse me a part of my expenditure for advertisement which I am doing on a pretty large scale by the way of Newspaper publications, fine placards with Ceylon views, Cards, Pamphlets, and samples of Pure Ceylon Tea distributed *gratis* all over the country.—I am, dear sir, yours faithfully,

(Signed) M. ROGIVUE.

TEA PICKING.

[TO THE EDITOR OF THE "PLANTER."]

Coonoor, May 29.

Sir,—I should like to know if the following record pick of tea leaf has been beaten on these Hills. The field is one planted in 1889 with plants from our own seed, off indigenous single plants. The plucking fairly fine, viz., two leaves and a bud. The field had its first low prune in July last only. The individual figures for fifteen pluckers are as follows:—58, 37, 50, 58, 60, 60, 60, 46, 55, 63, 64, 54, 48, 56, 59. The 68 was picked by a little Badaga girl, named Gunghee, who is about ten years old only. I do not piek by contraet, but give small rewards now and again for merit. I have never, in my eighteen years on these Hills, had any better picks! The total into the factory for the day was 3,350 pounds, beating the previous highest record by 350 pounds. But for a heavy downpour of over an inch, lasting over an hour, the pick would have been far larger.

THOS. BROWN.

[Have any Ceylon planters larger figures to show?—ED. *T.A.*]

FACILITIES FOR MAKING GOOD TEA—IX.

From Uva, we have a letter from Passara and one from Madulsima, both of which indicate satisfaction with the quality of tea now produced—the former district recognising no existing drawbacks to good manufacture, and the latter holding that its teas are equal, and in many cases superior, to what used to be turned out when prices were at their highest—the estates themselves being in better condition than ever before. In both divisions, the jât is generally good with very little that is inferior; while the soil too answers to the same description, there being no worn-out estates, most of them having been newly planted, and evidently not needing manure, as the answer from Passara to the question whether manuring would improve the tea and be profitable, is a simple "no." While Madulsima admits some deficiency in withering accommodation, Passara, where the factories are all new, considers the accommodation sufficient; and both divisions are blessed with factories well-equipped with machinery, and with abundance of motive power. In pruning, too, they have not suffered either from neglect or severity, regular and systematic use of the knife being the rule. Being blessed with well-distributed rainfall, Passara claims to have one of the best tea climates in Uva; but there is very little land left in the hands of Government for extension; while Madulsima, with its teas as good as ever they were, holds the London market alone responsible for low prices.

From the Southern low-country we have a letter from Neboda, which finds the weather the chief drawback to the manufacture of better tea, as the effect of successive wet days is to prevent successful withering, and a letter from Bentota which complains of insufficiency of withering accommodation which however, is being steadily remedied. From both districts we learn there is no inferior tea—the jât being very fair, middling to good. Though the soil may be generally poor, or appear so, it contains a lot of iron or other constituents which the tea bush affects; while where rocks abound the soil is rich. There are no exhausted estates, in the sense of those which will not repay cultivation; but both letters agree that manure would improve the tea and make it more profitable—one, with the qualification that much depends on the manure chosen and on the methods of application. Without deficiency of withering accommodation being specially noticeable, three or four wet days disclose insufficient space; but otherwise factories are generally well-equipped. In Bentota the motive power is ample, but Neboda cannot express itself satisfied in the absence of an alternative to provide for a breakdown. The labour was sufficient at the time when the replies to the Circular were written last October, but as a rule it was otherwise. In early days the pruning was both too severe and too frequent, but there has been a great improvement lately; and there has been no neglect of pruning which though it may affect returns, is believed to be helpful to the bush. As a low-country tea district, Bentota leaves little to be desired, but it is idle to expect up-country characteristics in the tea produced. The same remark applies to Neboda, whose reflections on climate and altitude are worth reproducing:—

"The essentials in tea-making are good leaf and good withering. The districts which have the climate best adapted to provide these must make the best tea. The gradation from best to lowest quality depends on the degree to which districts possess the climate that will supply these essentials. It is difficult to suppose that anything can remedy the natural drawback of adverse climatic conditions. Thus it may be feared that chemistry must begin when the weather leaves off. Useful, though its labours may be (and we would hope that it may supply us with many hints to guide us towards better manufacture), it is clear that the tea districts are tied and bound to conditions which, in the main, settle once for all their degree of suitableness for tea cultivation. Parts of Dimbula may be taken as supplying the best conditions. From that starting point you can go through the list, each supplying its weather-gauge for quality and quantity. Too dry, too wet, too irregular—each with its debit and credit of bad and good, all short of the standard: some from worn-out soil as an additional handicap, hopelessly so. This district, judging by their tests, is far from the bottom of the list, and should be 'suitable' for tea for a long time to come."

TEA BLIGHT—CACAO—RUBBER.

(*From the Cryptogamist in England.*)

INTERESTING NOTES FROM MR. CARRUTHERS.

Writing to us on May 19th, Mr. Carruthers is good enough to send us the following interesting notes:—

"I noticed in all the Ceylon papers that that report of my inspection of a tea estate for the presence of fungi—printed 'there is *just* one disease', instead of 'there is *first* one disease' which made it read rather foolishly in my mind.

"I was sorry you considered the report unworthy,* but I was requested to go and report, and on a few hours' inspection I couldn't gain or impart more information than I did. I know Dr. Watt's publications *re* tea and other blights—he only compiles these things. Massee of Kew works at them and the dry or pickled specimens don't give the best material for work: consequently the 'grey blight' and many other fungi have never been investigated and only one stage of their lives described—their life history is unknown. I have here material which I collected, which I hope will enable me to give a more complete account of them, but have as yet had no time to look at it.

"I have heard no word as to the Commission on Agriculture. I suppose it has come to some conclusions. [Not yet: still sitting.—ED. *T.A.*]

"Just now I am trying to get the Nectria from the Ceylon cacao to grow on apple trees here, as I want to prove it as a distinct physiological species from N. ditissima, the apple canker here. I have some experiments at Rothamsted and here.

"I have been approached with a view to my visiting Mexico to report on rubber es-

* We felt that Mr. Carruthers had not done justice to himself or to the blight he was called on to deal with: it is a matter that will require careful consideration on the part of experts.—ED. *T.A.*

tates there, and if I go I shall make a détour to some of the West Indian Islands, if I can afford it, and see their cacao there, and may have some information for you.

"I was reading a pamphlet on Vanilla culture in the Seychelles, published recently by the U.S. Department of Agriculture,* and will write some notes and send them by next mail if I can: you may find them of interest to your constituents.

"It is a healthy sign to my mind that at home just now the two most important questions interesting the nation are the preservation of the 'day of rest'—one day in seven—and the battle against Romanising and ritualistic tendencies in the Church. The Sunday *Daily Mail* has given way before the weight of public opinion and stopped issue."

MALARIA: MAJOR RONALD ROSS ON.

The following is the text of the Report lately submitted by Major Ronald Ross, I.M.S., on his special investigations into malaria parasites:—

I have the honour to address you, on completion of my term of special duty for the investigation of malaria, on the subject of the practical results as regards the prevention of the disease which may be expected to arise from my researches: and I trust that this letter may be submitted to Government, if the Director-General thinks fit.

MOSQUITOES AND MALARIA.

It has been shewn in my reports to you that the parasites of malaria pass a stage of their existence in certain species of mosquitoes, by the bites of which they are inoculated into tho blood of healthy men and birds. These observations have solved the problem—previously thought insoluble—of the mode of life of these parasites in external nature. My results have been accepted by Dr. Laveran, the discoverer of the parasites of malaria; by Dr. Manson, who elaborated the mosquito theory of malaria; by Dr. Nuttall of the Hygienic Institute of Berlin, who has made a special study of the relations between insects and disease; and, I understand, by M. Metchinkoff, Director of the Laboratory of the Pasteur Institute in Paris. Lately, moreover Dr. C. W. Daniels of the Malaria Commission, who has been sent to study with me in Calcutta, has confirmed my observations in a special report to the Royal Society; while, lastly, Professor Grassi and Drs. Bignami and Bastianelli of Rome have been able, after receiving specimens and copies of my reports from me, to repeat my experiments in detail, and to follow two of the parasites of human malaria through all their stages in a species of mosquito called the Anopheles Claviger. It may, therefore, be finally accepted as a fact that malaria is communicated by the bites of some species of mosquito; and to judge from the general laws governing the development of parasitic animals, such as the parasites of malaria, this is very probably the only way in which infection is acquired, in which opinion, several distinguished men of science concur with me.

In considering this statement, it is necessary to remember that it does not refer to the mere recurrences of fever to which people previously infected are often subject as the result of chill, fatigue and so on. When I say that malaria is communicated by the bites of mosquitoes, I allude only to the original infection. It is also necessary to guard against assertions to the effect that malaria is prevalent where mosquitoes and gnats do not exist. In my experience, when the facts come to be enquired into such assertions are found to be untrue. Scientific research has now yielded so absolute a proof of the mosquito theory of malaria that hearsay evidence opposed to it can no longer carry any weight.

PRACTICAL REMEDIES.

Hence it follows that, in order to eliminate malaria, wholly or partly from a given locality, it is necessary only to exterminate the various species of insect which carry the infection. This will certainly remove the malaria to a large extent and will almost certainly remove it altogether. It remains only to consider whether such a measure is practicable. Theoretically the extermination of mosquitoes is a very simple matter. These insects are always hatched from aquatic larvæ or grubs which can live only in small stagnant collections of water, such as pots and tubs of water, garden cisterns, wells, ditches and drains, small ponds, half-dried water-courses, and temporary pools of rain water. So far as I have yet observed, the larvæ are seldom to be found in larger bodies of water, such as tanks, rice fields, streams and rivers, and lakes, because in such places they are devoured by minnows and other small fish. Nor have I ever seen any evidence in favour of the popular view that they breed in damp grass, dead leaves, and so on. Hence in order to get rid of these insects from a locality, it will suffice to empty out or drain away or treat with certain chemicals the small collections of water in which their larvæ must pass their existence. But the practicability of this will depend on circumstances—especially, I think, on the species of mosquito with which we wish to deal. In my experience, different species select different habitations for their larvæ. Thus the common "brindled mosquitoes" breed almost entirely in pots and tubs of water; the common "grey mosquitoes" only in cisterns, ditches and drains; while the rarer "spotted-winged mosquitoes" seem to choose only shallow rain-water puddles and ponds too large to dry up under a week or more and too small or too foul and stagnant for minnows. Hence the larvæ of the first two varieties are found in large numbers round almost all human dwellings in India; and, because their breeding grounds—namely vessels of water, drains and wells—are so numerous and are so frequently contained in private tenements, it will be almost impossible to exterminate them on a large scale. On the other hand, spotted-winged mosquitoes are generally much more rare than the other two varieties. They do not appear to breed in wells, cisterns and vessels of water, and therefore have no special connection with human habitations. In fact, it is usually a matter of some difficulty to obtain their larvæ. Small pools of any permanence —such as they require—are not common in most parts of India, except during the rains, and then pools of this kind are generally full of minnows which make short work of any mosquitoe larvæ they may find. In other words, the breeding grounds of the spotted-winged varieties seem to be so isolated and small that I think it may be possible to exterminate this species under certain circumstances. The importance of these observations will be apparent when I add that hitherto the parasites of human malaria have been found only in spotted-winged mosquitoes—namely in two species of them in India and in one species in Italy. As the result of very numerous experiments I think that the common brindled and grey mosquitoes are quite innocuous as regards human malaria—a fortunate circumstance for the human race in the tropics. And Professor Grassi seems to have come to the same conclusion as the result of his enquiries in Italy.

WORDS OF CAUTION.

But I wish to be understood as writing with all due caution on these points. Up to the present our knowledge, both as regards the habits of the various species of mosquito and as regards the capacity of each for carrying malaria is not complete. All I can now say is that if my anticipations be realised—if it be found that the malaria-bearing species of mosquito multiply in only small isolated collections of water which can easily be dissipated—we shall possess a simple mode of eliminating malaria from certain localities. I limit this statement to certain localities only, because it is obvious that where the breeding

* Quoted in *Tropical Agriculturist.*—ED. *T.A.*

pools are very numerous, as in water-logged country, or where the inhabitants are not sufficiently advanced to take the necessary precautions, we can scarcely expect the recent observations to be of much use—at least for some years to come. And this limitation must, I fear, exclude most of the rural areas in India. Where, however, the breeding pools are not very numerous and where there is anything approaching a competent sanitary establishment, we may, I think, hope to reap the benefit of these discoveries. And this should apply to the most crowded areas, such as those of cities, towns and cantonments, and also to tea, coffee, and indigo estates, and perhaps to military camps. For instance, malaria causes an enormous amount of sickness among the poor in most Indian cities. Here the common species of mosquitoes breed in the precincts of almost all the houses, and can therefore scarcely be exterminated; but pools suitable for the spotted-winged varieties are comparatively scarce, being found only on vacant areas, ill-kept gardens, or beside roads, in very exceptional positions where they can neither dry up quickly nor contain fish. Thus a single small puddle may supply the dangerous mosquitoes to several square miles containing a crowded population: if this be detected and drained off—which will generally cost only a very few rupees—we may expect malaria to vanish from that particular area. The same considerations will apply to military cantonments and estates under cultivation. In many such malaria cases the bulk of the sickness and may often, I think, originate from two or three small puddles of a few square yards in size. Thus in a malarious part of the cantonment of Secunderabad, I found the larvæ of spotted-winged mosquitoes only after a long search in a single little pool which could be filled up with a few cart-loads of town rubbish. In making these suggestions I do not wish to excite hopes which may ultimately prove to have been unfounded. We do not yet know all the dangerous species of mosquito, nor do we even possess an exhaustive knowledge of the haunts and habits of any one variety. I wish merely to indicate what, so far as I can see at present, may become a very simple means of eradicating malaria.

HOPE FOR THE FUTURE.

One thing may be said for certain. Where previously we have been unable to point out the exact origin of the malaria in a locality and have thought that it rises from the soil generally, we may now hope for much more precise knowledge regarding its source; and it will be contrary to experience if human ingenuity does not finally succeed in turning such information to practical account. More than this if the distinguishing characteristics of the malaria-bearing mosquitoes are sufficiently marked (if for instance, they all have spotted wings), people forced to live or travel in malarious districts will ultimately come to recognise them and to take precautions against being bitten by them. Before practical results can be reasonably looked for, however, we must find precisely—

(*a*) What species of Indian mosquitoes do and do not carry human malaria.

(*b*) What are the habits of the dangerous varieties, I hope, therefore, that I may be permitted to urge the desirability of carrying out this research. It will no longer present any scientific difficulties, as only the methods already successfully adopted will be required. The results obtained will be quite unequivocal and definite.

FURTHER INVESTIGATIONS.

But the inquiry should be exhaustive. It will not suffice to distinguish merely one or two malaria-bearing species of mosquito in one or two localities; we should learn to know all of them in all parts of the country. The investigation will be abbreviated if the dangerous species be found to belong only to one class of mosquito, as I think is likely; and the researches which are now being energetically entered upon in Germany, Italy, America and Africa will assist any which may be undertaken in India, though there is reason for thinking that the malaria-bearing species differ in various countries. As each species is detected it will be possible to attempt measures at once for its extermination in given localities as an experiment. I regret that, owing to my work connected with *kala-azar*, I have not been able to advance this branch of knowledge as much during my term of special duty as I had hoped to do; but I think that the solution of the malaria problem which has been obtained during this period will ultimately yield results of practical importance.
—*Madras Mail*, June 1.

THE INDIAN SUGAR INDUSTRY.

We have, from time to time, placed before our readers the substance of the grievances of the Indian sugar producers, and we have been able to sympathise with them in the unfair competition created by foreign bounties, and generally to approve the action of the Indian Government in proclaiming countervailing duties to counteract the effect of these bounties. Those who oppose the imposition of the new duties, have taken their stand partly on principle, alleging a violation of free trade, and partly on injustice to the consumer whose sugar has been rendered dearer to the extent of the duties imposed. The obvious answer to the first objection is that it is the bounties which are a violation of free trade, and that the sole object of the duties is to remove from the shoulders of the local producer the burden which is placed thereon by foreign bounties—and thus to promote free trade and equal competition. The consumer will probably be inconvenienced to some extent; but it is only the well-to-do consumer into whose diet refined sugar enters and who can afford to bear the small burden for the benefit of the poverty-stricken agriculturist, who is handicapped in the sale of his canes by the immense quantities of beet-root, bounty-fed sugar which is poured into India from Continental manufactories. A further objection has since been urged, that the duties are intended really for the benefit of Indian refiners who cannot turn out sugar of the quality of French and German sugar. An Indian contemporary publishes information which he has collected at some pains to combat this view, whose energetic exponent has been Mr. Harold Cox, who has declared that the best Indian sugar refineries have hitherto turned out only second-class sugar which cannot come near the article produced in Germany and Austria. The expert to whom the *Friend of India* referred the matter, has no hesitation in declaring the best Indian cane sugar, not only not inferior to the best imported sugar, but actually superior to it. The quantity produced, however, of this superior sugar is small; and the limitation is said to be solely due to the influence of unfair competition involved in foreign bounties. Capital fights shy of an industry which has to compete with unknown forces; and though India cannot just now produce all the first-class sugar for which there is a demand within its territories, it is quite able, with the encouragement offered by countervailing duties, to increase its output of sugar of the finest qualities so as to meet most of

the demand. Indeed, the work of extension had begun, when it was arrested by the enormous imports of bounty-fed sugar; and the Indian producer, more recently handicapped by the rise in exchange, has been further victimised by the proclamation of countervailing duties in America, whence large quantities of sugar were diverted into India! In the interests of the poorer classes of both producers and consumers, therefore, it is absolutely necessary that the cane and date sugar industries should not be allowed to be crushed out, while encouragement should be given to the higher class of refineries, so that they might compete on equal terms with foreign bounty-fed establishments. Whether India can really hold its own in competition with Europe can be ascertained only by the withdrawal of bounties by continental nations, following which the new duties must be withdrawn; but the alleged interests of consumers must not be allowed to inflict hardship on tens of thousands of agriculturists, whose industry, if it is once ruined, it may take years to revive.

RUBBER CULTIVATION IN CEYLON.

There can be no doubt of the practical value of the information which the Director of the Royal Botanic Gardens has put forth from time to time in respect of rubber-yielding trees and their cultivation in Ceylon. Planters who have studied the successive "Circulars," either at first hand or as reproduced in our *Tropical Agriculturist*, must have acquired a great deal of useful information respecting the different varieties of plants and their properties; but we fear they have not been at all prepared for the reversal of fortune which has overtaken the particular rubber-tree which has so long maintained the lead as chief favourite, namely the *Hevea Braziliensis*, or Para-rubber tree. For various reasons detailed in Mr. Willis's latest Circular, Para may be said to be now dethroned, and Castilloa (the Mexican rival), belonging to the same group as our Bread-and Jak-fruit trees, has been erected in its place. We fear a number of planters who went in largely for "Para," following the leading in the earlier Circulars, will be apt to become a little impatient with the expert advice and will be inclined to ask (however unjustly or inappropriately)—

'Tis true you dissembled your love,
But why did you kick us downstairs?

In other words, is it not possible that Para may be a little unduly depreciated, even in the light of the most recent discoveries and inventions, and that though it may be advisable now for all who wish to cultivate rubber to apply for "Castilloa," still that those who have planted out "Para" should "ca' canny" as they say in Scotland, and by no means view their investment as a mistake. In the first place, who can tell what another year,—another revolution of the wheel of discovery and invention,—may reveal. Again and again has the "whirligig of time brought in its revenges," and we may yet see that further scientific as well as inventive progress has restored "Para" to its position of prestige, or at least brought it alongside of "Castilloa." So, while going in as freely as possible for the Mexican tree according to the latest deliverance, let not the clearings or boundaries of the Brazilian variety be neglected. Why even the despised "Ceara," if all reports be true, is likely to come once more to the front, under the new influence of invention and scientific enquiry; and we may have certain gentlemen who went in largely in the "eighties" for the quick growing variety, looking out their clearings, chena-grown as they may be, and once more doing justice to their plantings of ten to fifteen years ago. One such Ceara clearing if not rooted out for tea, should be found in the neighbourhood of Elkaduwa and another somewhere in the neighbourhood of Madawalatenna.

Meantime we have yet to read the details of Mr. Parkin's Report which the Director is said to be preparing for the Press; and even when we have perused and digested this supply of scientific information, it may well be asked, have we arrived at "finality" or even at "definite results?" Has Mr. Biffen, or the home inventors, no further steps to mark? He would be a bold man who would tender a negative to these questions. We must, of course, do the best by the light given to us for the present, and then wait in full expectation of learning more as time rolls on. No doubt, shrewd, observant men among our planters will begin to make experiments for themselves; and the results of these, when published, will provoke a healthy competition in the path marked out by scientific counsel, modified, it may be, by additional experience on the part of the cultivator.

Meantime, the present may be a favourable opportunity for taking stock of the progress actually made in the cultivation of the different kinds of Rubber by the planters of Ceylon, up to the present time: and in an early issue we hope to summarise information already placed at our disposal from a number of districts, bearing on this important practical side of the question.

TEA ON VIRGIN SOIL IN CEYLON.

ITS SUPERIORITY IN FLAVOUR AND STRENGTH.

In our last issue we quoted a Ceylon contemporary's remarks *re* the alleged superior quality which virgin soil gives to tea grown thereon. Statements such as these easily pass into current axioms and acquire the force of tradition if not rigidly examined at the outset. Without negativing the assertion, we should like to examine it closely and discover, if possible, the data upon which it is based. We presume the idea arose in the writer's mind from the fact that Ceylon teas in the early years commanded higher price than they do now, proportionately, and in fact at that time stood above Indians, the reverse being now the case. Generations among Europeans in the East being covered by but a short span of years, it is easy to lose sight of the circumstances in the beginning of things. It is plain to see that the writer of the assertion is not perfectly *au fait* with early tea-planting in Ceylon. He has assumed that tea in that island was originally planted in virgin soil, which our information does not warrant. It was, in fact by no means the case universally.

Tea was originally put down in Ceylon as an experiment by owners of failing coffee plantations

upon old coffee land, by no means virgin land. The coffee was grubbed out to make room for it in some cases, and in other cases the tea was so much in the nature of a tentative effort that the plants were put down between the rows of coffee, and only when the experiment was found a decided success was the latter rooted out. From the very first Ceylon tea was a success on the market; and these teas, grown upon old, exhausted coffee land, in point of quality, were equal to the best. In combating the acceptance of a dogmatic conclusion of this kind without examination, we would not be held to fall into the other extreme. The question requires very careful investigation all round, and valuable information is to be drawn therefrom. We consider, in view of the above considerations, that the absolute necessity of *virgin* soil for the production of the highest qualities of tea is not proved, if indeed the facts do not go to disprove it, since we see that in early Ceylon days tea equal to the best was grown an old coffee land. We think, however, that an investigation of those early days will help Mr. Kelway-Bamber, who is reported to have devoted himself to the problem, towards the solution.

Ceylon estates used to be remarkable for high cultivation and heavy manuring. We remember particularly the original 100 acres on the Mazawatte tea estate (planted on old coffee land), which gave a phenomenal yield of 1,200lb. to the acre of good class tea, used to be described as a perfect manure heap. This would seem to show that well cultivated old land is equal to virgin soil for the production of tea, a conclusion, by the way, which is borne out on other agricultural crops, and would tend to cast a doubt on the statement for which our Ceylon contemporary is responsible, that "More has to be studied than renovating and renewing the soil." In this connection it would be advisable, perhaps indispensable, to collate information as to whether reduced prices for tea and the consequent necessity of cutting down working-expenses have not forced the Ceylon men to lower their standard of cultivation, before drawing a hard-and-fast conclusion that Ceylon tea has fallen off in quality, merely because the tea lands are no longer "virgin." Our own planters would be able to throw more light on this question than we can hope from Ceylon, for the most ancient of the Island tea is very youthful in comparison to thousands of acres in Assam and Darjeeling.

We should be glad to receive opinions and information upon this subject from our own planters, whose experience, as we say above, must be far greater than that of the managers in the comparatively young tea colony of Ceylon. We think this is not a question to dogmatise upon without a vast deal more information being brought together, and that the matter may fairly be regarded as a very open one. At any rate, we think it is far too early for Ceylon to complain of exhausted soil as a cause for the fall in their tea prices as compared with Indian. If the argument should be erroneous, it would be distinctly harmful to Ceylon interests, as leading them away from the true causes to which they should seek to apply a remedy. If true, Indian planters may be excused for looking on Ceylon as resembling Gilbert's precocious infant, who died "a worn out debauchee of seven."—*Indian Planters' Gazette.*

"BRITAIN OF THE SOUTH."

(*From a Ceylon Visitor's point of view.*)

PONSONBY, NEW ZEALAND, May 11.

I have not forgotten the request you made me just as I was leaving Ceylon that I would drop you a few lines giving my impressions of this Colony, and the matter has been in abeyance only because of pressure of work and because I wanted to allow time for a distinct impression of the general bearing of things over here to be made on my own mind,

CLIMATE IN THIS NORTH ISLAND

is as near perfection as anything mundane can be. During February and March we had most superb weather and in April it was delightful too, though with occasional showers. Now in May (answering to November in Britain) it is cold at night and in the early morning, but warm in the daytime when fine. Very few people have started fires yet. Some fruits, such as pomegranates and persimons, are still on the trees, guavas having just been gathered in; of course, apples, pears, plums and peaches were earlier. The gardens are still ablaze with flowers, chiefly chrysanthemums, cosmos, and camellias, though geraniums, pelargoniums, Japanese anemones and fuschias are in evidence, too. A Ceylon visitor soon finds acquaintances among the plants and shrubs here. The ordinary red hibiscus is in almost every garden, rather dwarf plantain-trees are cultivated here and there though I have never seen them fruiting, palms of various species are seen occasionally, the large white trumpet flower (a double variety, though) grows on bushes as large as those in Ceylon.

THE SOIL

is volcanic. From the road near here, three distinct (but happily extinct) cones are to be seen, and from one point near Auckland, I believe, that fifteen are visible. There must have lively doings here in "the braw days of old."

THE ROADS

are simply execrable. They sadly want a P.W.D. here. Of course, they want good metal too, scoria large volcanic cinders the size of a gallon loaf, not lending itself at all kindly to road-making. Above all, they need the cooly, accustomed to task-work and willing to work for as many pence a day as the labourer here asks shillings.

The scarcity and high-price of

LABOUR

is one of the serious drawbacks to this colony. A charwoman asks four and six pence a day working from 7-30 to 3-30 and getting dinner and tea; she also requires to have the kitchen copper fire lighted for her and the water boiling before she arrives and a pile of firewood sufficient for the day chopped up and heaped beside the copper. As for housemaids, most ladies here seem to think that it is far less trouble to do without them; and certainly in those cases where they cannot be dispensed with, they are very expensive necessaries.

The habit of drudging for themselves into which most people seem to fall into here, though it has its pleasing side as fostering independence, is not without undesirable results as well.

READING

people are very few and far between, and I should say that the intellectual average of the middle class (there is no higher class here) is very far below that of the same class in England. Here and there you meet a man (generally a Scot from Glasgow) who keeps up his reading, but the majority of the people go no higher than an occasional novel hired for two-pence from trumpery "Circulating Libraries" kept by very small book-sellers. The fault is not so much with the people as with the kind of life this country forces upon them. Where men and women get only an hour or so of respite from manual labour of the roughest sort daily, there is little time and less energy for the cultivation of the mind; if books are sought at all in such circumstances, it

is as a relaxation, not as a means of culture. The results of this are beginning to appear. The range of conversation among middle class young men, young men in business in the colonies, is much narrower than that of the same class at home, for the simple reason that the mind runs in a narrower groove. Allusions in sermons and lectures and addresses to characters and situations in Standard Literature, to scientific or historical points, are seized by only the very few; a really good speech would be surer of being appreciated in Colombo or Kandy even, than here in British Auckland. One of the gravest perils threatening the Australasian colonies is this intellectual narrowing and dwarfing that is going on. While in Britain and many of the colonies there is intellectual elevation observable generation after generation, in these Australasian colonies alone there is deterioration; the old settler with just his memories of the old home life, and the remaining vestiges of his interest in the wider life he had at home, is generally intellectually (though often not educationally) the superior of his sons born in the colonies, his intellectual horizon being a wider one. How this will work out in another generation or two who can tell? Nobody who wants to see these colonies well to the fore in the competitions of the future (competitions in which intellect will ever give greater and greater advantage) can contemplate this feature of colonial life exactly with equanimity. Better subsidise Chinese and Indian coolies to come into the colonies and so secure for the average British there a little leisure for mental culture even though the working man's present preposterous wage is reduced a fraction or two, than by the present system pursued to train—for future competition with the home country and America and with other wiser colonies—a generation of well-fed animals with muscles well developed by labour, with power to read, write and count as the result of the really splendid educational system, but with a mind that has no interests beyond the work by which bread is earned. "Man shall not live by bread alone," *cannot*, without soon sinking below the ordained level of man. If man could live by

BREAD ALONE,

using the word in its wider (Scripture) sense, this would be a Paradise, for butcher's meat is very cheap. Beef is about four pence a pound and mutton twopence. This is as near the lowest as it can well be, while still leaving to the public the flattering consciousness that they are paying for it. There are no poor people as far as I can see; I have never seen a hungry-looking face since I landed here; but I have seen sleek dogs passing contemptuously by bits of meat thrown to them from butchers' stalls, which would have been accepted by any of tens of thousands of human poor in England with loud blessings on the head of the donor.

It is a curious experiment commercially that is being tried here, namely, to develop a new country

WITHOUT CAPITALISTS.

I am not in a position to prophesy about the future, but at present everything seems to be languishing for a little more money than the authorities can spend on it. Auckland is a large and commercially flourishing city, but its buildings are poor; its streets, though wide are badly kept, some of the leading thoroughfares having strips of grass in huge tufts disfiguring them at intervals and being yellow with what looks like chaff, but which is the horse manure of months pounded by the horses' feet and scattered by the winds; the footpaths are in many places half covered with asphalt and half left bare; at night you have to stumble about in the streets for the lamps are poor and far apart, and so unusual is anything more than the single-burner street lamp, that the erection of a triple-burner lamp in a suburb has led the "three lamps" at Ponsonby to be known as a land mark all over the city. Auckland might have been a splendid city had there been finances to develope it on the lines on which it was originally laid out, but at present it wears the appearance of a splendid estate which has descended to an impecunious lord; and I am told (I know nothing by experience beyond Auckland) that this is the character of the colony lately. It is a pity that in avoiding the class-legislation of England, New Zealand should have adopted another form of the same thing. How difficult it is to be truly democratic! Democracy is Government by the people for the people, and the capitalist and the brain-worker are as much part of the Demos as is the 'orny 'anded, and legislation that hampers the capitalist in favour of the working man is as contradictory to the true principles of democracy as legislation for the capitalist which disregards the interest of the working man.

CEYLON TEA

is advertised in every street and on every train and omnibus in Auckland and was well to the fore in the recent Auckland Exhibition.

CABBAGE BANANA.

A NEW VEGETABLE FOR TABLE USE.

OUR attention has been drawn to the following extract in the *Florida Agriculturist*, referring to the "Abyssinian Banana" which has been introduced into Ceylon and is growing luxuriantly at Hakgala Gardens. The Superintendent of the National Botanic Gardens, United States, is responsible for stating that the ornamental value of this plant may be eclipsed by its usefulness as an esculent, and so he would call it the "cabbage banana." We are next treated to the following interesting extract from James Bruce's "Travels in Abyssinia to discover the source of the Nile," published in Edinburgh so far back as 1890. Mr. Bruce was a much-traduced writer; but all his statements have since been verified. He wrote:—

"It is said that the Galla, when transplanted into Abyssinia, brought for their particular use the coffee tree and the ensete (banana), the use of neither of which was before known. However, the general opinion is that both are naturally produced in Abyssinia, provided there is heat and moisture. It grows and comes to great perfection in Gondar, but it most abounds in that part of Maitscha and Goutto west of the Nile, where there are large plantations of it, and is there, almost exclusive of anything else, the food of the Galla inhabiting that province; Maitsha is nearly upon a dead level, and the rains have no slope to get off easily, but stagnate and prevent the sowing of grain. Vegetable food would, therefore, be very scarce in Maitsha were it not for this plant. As soon as the stalk of the ensete appears perfect and full of leaves, the body of the plant turns hard and fibrous, and is no longer eatable; before it is the best of all vegetables. When you make use of the ensete for eating you cut it immediately above the small detached roots, and perhaps a foot or two higher, as the plant

is of age. You strip the green from the upper part till it becomes white ; when soft like a turnip well boiled, if eaten with milk or butter, it is the best of all foods, nourishing and easily digested."

The "proof of the pudding is the eating thereof"; and accordingly we have been favoured by Mr. Nock with the result of a trial made by him of part of the stem of an Abyssinian banana in the Gardens. He writes :—"We tried some last night and find it very fair, but a trifle bitter. I daresay with practice in cooking and choosing the right part of the stem, it would make a nice change as a vegetable. It is rather rare in Ceylon, but can be propagated to any extent by seeds. As an ornamental plant it is one of the handsomest known."

This banana is a larger and far showier plant or cluster of plants than our ordinary banana. In America seeds were selling at a penny a piece, and the plant is likely to be largely grown as a vegetable. Here it ought to do well in gardens throughout Upper Uva and the higher planting districts generally.

ENEMIES OF THE COFFEE TREE IN B.C. AFRICA.

(*From an ex-Ceylon planter.*)

BORER No. 1

After a coffee clearing gets a year old, be on the outlook for the longicorn beetles, for they emerge from their cavity in the trees of the forest and begin to fly about from the middle of November to the middle of March (practically four months), during which time they are maturing and laying their eggs ; and as sure as fate many will find their way into a coffee estate. When they find coffee, as they seemingly do, a palatable food, they live on the bark of the plants, and the female lays her eggs, usually from five to seven in number. From tree to tree she flies and lays only one egg, be it remembered, at the bottom of each tree in the ground (not as is usually supposed on the tree itself) about the size of a small canary seed, dirty-yellow in colour. The egg soon hatches and finds its way, as a very diminutive grub, to the root of the coffee and begins to nibble at the bark just at the collar of the plant. Working its way in it soon has a covering nest protecting it from birds and insects ; ants even cannot get at it. In the course of a month or two, the forceps of the grub become strong enough to tackle the wood, which it burrows into and lives upon, till fully matured, boring up or down the tree, turning out saw-dust and keeping its hole open to prevent suffocation till fully matured, taking about six months before turning into the chrysalis stage ; during this time he either kills the young tree outright, or damages it so much that it never recovers or makes a healthy tree afterwards. After the first rains in November and December the borer grub flies as a full-fledged beetle and having found a favourite feeding and breeding tree in our coffee estates, sticks to it and again begins egg-laying. Some of my planting friends may say, "Oh, I have found half a dozen borers in one tree." This may be so, but I challenge any planter to produce more than one borer in young coffee under two or three years old. It is when an estate becomes a nursery for the longicorn and several beetles lay eggs at the root of a tree, that a number are found, or the same beetle may lay more than one on the same ground, for it lays six to seven eggs ; but this is not likely, for it flies about at night, seldom resting more than an hour or so, on one tree, although it sometimes feeds a whole day on the same tree ; I judge from the amount of bark eaten. I feel almost certain eggs are only laid at night and not during the daytime when the beetle is at rest and feeding or basking half asleep on the sunny side of a coffee tree.

So much for borer No. 1. I shall now describe

BORER NO. 2

which comes from the larva of a yellowish white moth with steel bars across its body, not so bright and visible as the Ceylon moth. This moth lays its eggs, usually only one, in a little web on the leaf of a coffee tree about the month of January usually, and the egg soon turns into a borer which finds its way into the coffee tree by means of a puncture it manages to make in tender green wood either in a branch or the stem of the tree and works its way into the pith along the primary and down the stem making air holes as it goes along (also pushing out saw-dust the same as the longicorn grub) till it reaches the root : only working in the pith, be it remembered, till it forms a chrysalis in four to six months' time. This borer is not very destructive, and is easily discovered as the branch or top of the tree it enters by usually dies. I have never found more than one in a tree. Both these borers I have seen in Ceylon—the first called the white borer, and the other the red borer ; but the damage done was so trifling that they were hardly known to casual observers. I was always fond of "poochi" catching and have caught many of the same stag beetles and moths in Ceylon.

WHITE GRUB.

This is the most common of all grubs, and perhaps does more damage to young coffee than the borer. The beetle is chocolate coloured, and the grub is white, and curls up when exposed on the surface of the ground. This insect, unlike the borer, seems to propagate all the year round having no set time of year for laying eggs and lying in the chrysalis s age, for I have found grub of all sizes, and beetles, all in the same place, at the same time the farmer busy trimming the fibrous feeding roots of the coffee as fast as they are made.

BLACK GRUB.

This grub is very destructive, especially in vegetable gardens. It comes to the surface at night, cuts off coffee seedlings and rings larger plants at the collar and even goes the length of climbing for a leaf occasionally. In the case of its feeding operations being disturbed by the break of day, it pulls the leaf into its hole underground where it habitually descends to rest during the daytime. I do not think this insect eats the coffee roots like the white grub, but it does a tremendous amount of damage to nurseries and young plants in a new clearing—this I am certain of. The moth of this grub is black with a torpedo-shaped body, prominent eyes, and flies very fast ; it appears just at dusk, darting about seeking food in flower gardens and elsewhere and laying its eggs, but how many I do not know, in November and December. The grub lives about six months and then turns into a repulsive looking, glossy chrysalis with a hard shell, sharp-pointed at one end and twists about the sharp end when touched. Black soil rich in vegetable humous is full of this grub and it is seldom found in poor land.

WIRE WORM.

This is the only other grub that attacks coffee to my knowledge : the beetle is small, about as big as an ordinary cleg-fly, and has a habit of pretending to be dead when caught. When turned on his back he lies still for a short time till he thinks all danger is over ; then arching his body by drawing together both ends, springs in the air about a yard and lands on his feet and flies. I do not know how long the grub of this beetle remains alive ; but in one case long enough, I have known one to kill out an "anona" (bullock's heart) tree three years old—I should imagine about six months. He is not very destructive to coffee (in fact not at all common), but does a lot of damage to fruit trees and vegetables.

STICK INSECT.

This caterpillar cuts off the primaries and tops of coffee plants, and arranges them round its body lengthways, binding them together with a strong, tough web. This house or shell it lives in, stretching itself in and out of it, according as required to enable it to walk about

with its house on its back. It does a lot of damage barking the coffee plants, sometimes ringing them right round, completely stopping the flow of sap; and it should be considered an enemy of our coffee and destroyed. This caterpillar lives from February to June in Nyassaland.

CRICKETS AND LOCUSTS

comprise a very large family indeed; but there are only a few that feed on and do damage to coffee and they are principally the green-backed, handsome fellows with yellow and blue rings round the body. They have stumpy wings and a hard, horny, sword-like beak. I don't think they fly, at least I have never seen them do so. These locusts do a lot of damage barking the coffee and may well be destroyed as an enemy of the coffee tree. Several others of the cricket locust family do some damage by cutting down small plants.

BLACK BUG

I have seen, but only on an individual tree or two; but it never spreads. It appears in February or March and disappears in May and June. This pest, I am of opinion, is kept in check by the lady-bird beetle, which is common in the country and is seen very lively on our coffee bushes at the time black bug appears, and it is well-known it preys upon the bug family.

COFFEE LICE

I have seen covering an individual coffee bush, but like the bug it never spreads, and is probably devoured by some tiger of the insect family.

THRIPS.

During a very dry season it appears about October and disappears with the first heavy thunder-storms towards the end of November or early in December—much damage done by the sun and heat during these two months, might be attributed to thrips. I don't think, however, that much harm can be done to our coffee by this insect, for the short time it is with us (and this only, to my knowledge, on two very dry years) that it can be considered very harmful or dangerous. H. B.

LIVE STOCK AND THEIR IMPROVEMENT.

Few things are of greater importance with reference to the well-being of the natives in certain remote pastoral districts of the island than the improvement of their live stock. To secure this end, Sir Hercules Robinson established a Cattle Commission which had the late Mr. Wm. Smith, of Dimbula, as veterinary adviser, and the late Mr. John Capper as Secretary. Much information was collected and published and a great deal of "castration" was attended to, during the peregrinations of the Commission; but as in so many other efforts towards agricultural improvement, this proved a mere "flash in the pan" without any continuous result. The Cattle Commissioners' Report was pigeon-holed and forgotten, there being no one Department or officer responsible to see the recommendations carried out, or at any rate tested. It is well-known that both in the South (Hambantota), the South-east (the Park country), and in the North-Central and North-Eastern divisions, the natives feed large breeds of cattle; but give not the slightest attention to the quality of their stock. This is, of course, a matter which should be specially attended to by an Agricultural Director, Board, or Department by putting pressure from time to time on the provincial and district Agents. A gentleman, as well qualified as any in Ceylon to write on the subject, favours us with the following results of his observation and experience:—

"One great difficulty about improvement of cattle arises from the natural existing conditions. Take the Vanni (N. C. P. and N. P.), the people rear great herds of cattle as they have so much jungle and pasture lands. The cattle increase naturally and go on increasing until murrain breaks out and sweeps off two-thirds of them. They sell *very few*, partly from religious scruples; partly, because a man likes to say "I have so many cattle." ("*Pecunia*," comes from "pecus"—cattle!) *These cattle are not herded or selected or interfered with in any way.* They cost the owner absolutely nothing. So whatever he *sells* is clear profit without trouble. He *can* get from R20 to R40 for bulls and considers that good enough. So he says "Why should I trouble to rear a better stock?" So he will not pay for the service of (say) a Scinde *Bull.* Again the breed deteriorates because the man who comes round to buy naturally selects the best bull and the foolish villager sells it. Young and weak bulls run with the breed and again the consequence is deterioration, except so far as nature gives the strongest bull the advantage. Here possibly the advent of a Railway may raise the price of cattle when they can readily be taken to market, just as the making of roads raised the price of paddy; (when there were no roads, paddy sold in Nuwara Kalaviya for two-pence a bushel.) But until the market price of beef rises from 15 cents, it would not pay to kill fed-beef and it is doubtful whether even if beef were well paid for, the cattle owners would supply any better animals. Where cattle are run wild on the pasture grounds, you get no good from introducing a *good* bull, as all the other bulls run with the herd.

TEA ON VIRGIN SOIL IN CEYLON.—We do not know if the *Indian Planters' Gazette* is aiming at us in its disquisition on this subject which we quote elsewhere. But we have no hesitation in saying that there is a large and reliable body of experience before us to shew that tea grown on virgin soil in Ceylon has produced a tea greatly superior in flavour, if not in strength, to tea grown on land previously occupied by coffee or other product; and that, as years rolled by, the tea even on virgin soil gave a leaf which did not maintain its original reputation. Perhaps the Ceylon planter who went into this matter most carefully, was Mr. T. C. Owen, of the Knuckles and Kelebokke district,—compiler for us of the "Tea Planters' Manual," but who has now retired and joined the London firm of Messrs. Rowe, White & Co. We recall very distinctly Mr. Owen's statement that, do what he would, he could never recall the delicate aroma which distinguished his teas grown on virgin soil during the first four of five years. His report and the experience generally of other planters in those early days (1883-1890) will be found given in successive volumes of our *Tropical Agriculturist*; and, although allowance may have to be made in some cases for "a virgin soil" a good deal weaker in one district than in others—for instance, in a Northern district as compared with the higher districts around Nuwara Eliya with their stronger and richer soils—yet to keep up tea to its pristine vigour (dare we say, "and delicate flavour"), the soil must be supplied in some way with what it loses through successive, and perhaps heavy, crops of leaf.

TEA ENTERING U. STATES OF AMERICA :

STRINGENT CUSTOMS REGULATIONS.

The Treasnry Department, New York, has just issued Circular No. 51 contained in No. 14, vol. 1, "Treasury Decisions," containing the act to prevent the importation of impure and unwholesome tea and the regulation and standards which take effect on May 1, 1899, excepting in the case of teas shipped from abroad prior to April 1, 1899, which will be governed by the old standards.

Section 2 provides that the examination of teas shall be made by means of samples to be drawn from packages designated by the collector and to be furnished by the importer, and of additional samples to be obtained by the examiner. The importer shall furnish a sworn statement that any samples snbmitted by him to the examiner are drawn from packages designated by the collector and covered by his entry (naming the vessel), and that they represent the true qualities of each and every part of the invoice (including the proportion of dust), and accord with the specifications therein contained. The importer shall submit with his entry a chop list or specification of the several lines included in the invoice, and the collector shall select for examination packages representing the different lines. The examination and report npon snch samples shall be made in accordance with the provisions of section 7 of the tea act.

In comparing with standards, examiners areto test all the teas on these points, namely, for quality, for any foreign matter on the surface of the infusion, sometimes called scum, and for quality of leaf after infusion. Quality shall be ascertained by drawing according to the custom of the tea trade with the weight of a half dime to the cup. In Country Green teas, Imperial Hysons coarse leaf Gunpowders, and extra young Hysons are to be compared with Hyson standards, and all other young Hysons and small leaf Gunpowders with the young Hyson standard. The quality must be equal to standard, but the flavonr may be that of a different district as long as it is equal in sweetness. As an illustration, a Teenkai may be equal to a Moyune, but a distinctly smoky or rank Fychow, or Wencho of sour character, must not be considered as equal to the two first mentioned.

In order to test for floating colouring matter or scum, and also for the quality of infused leaf, a second drawing shonld be made for any floating substance, and after pouring off the water the infused leaf shonld be taken out so as to exhibit the lower side which rested against the cup. Should the mass show a larger quantity of exhausted or decayed leaf, or foreign snbstance than the standard, it shall be considered inferior in quality, and the tea must be rejected. In greens and Japans particularly, the brightness of the leaf should be considered as an evidence of quality.

Should a tea prove, on examination, to be plainly inferior to the standard in any one of the requisites —viz., quality, scum, or quality of infused leaf, it shall be rejected, notwithstanding that it be superior to the standard in some qualifications. All consideration of the appearance or so-called style of the dry leaf shall be omitted.

In the case of Ceylon and India teas, the needle leaf and Pekoe tips shall be separated by passing them together with the dust through a No. 26 sieve of No. 30 brass wire after the tea has been first sifted through a No. 16 sieve. Dust and fannings in Japan teas must not exceed 4 per cent. when tested by a No. 30 sieve of No. 31 brass wire. Before condemning any tea for dust, examiners shall sieve at least two packages.

Examiners should preserve in tin, for one year, samples of all teas examined for future reference in case of complaints, and the Board of General Appraisers should also retain a portion of all samples sent them on appeal for the same object. To this end, examiners should always send the Board samples of at least half a pound, and never otherwise than in tin cans securely labeled.

Statistics showing the quantities of various kinds of less admitted and rejected should be kept at the custom houses for future reference.

In all cases of rejections by examiners, the importer should be notified of the reason for rejection —that is, whether it be on the ground of quality, character of infused leaf, dust, scum, or admixture with foreign substance.

Whenever Japan teas shall be imported hereafter, so made up as to imitate the green teas of China, examiners will compare such teas with the pan-fired standards for Japan teas. Shonld such teas be made up so as to imitate Congous, they will be compared with the North China standards for Congons.

In cases of importations of tea containing an excessive amount of dust, the dust can be exported after sifting and tea admitted to entry if found np to tea standards.—*The Planter*, May 27.

SUIT V. THE AMERICAN CUSTOMS.

The application recently made before Judge Lacombe for an injunction against the Collector of the Port, the Tea Examiner, and the Board of General Appraisers, to prevent the rejection of certain teas which, it is asserted, differ in certain respects from the established standards and yet are equal thereto in purity, wholesomeness, and fitnesss for consumption and quality within the true intent and meaning of the act, has been denied.

It is claimed that the regulations of the Treasury under which rejections are made are illegal; that the true intent and purpose of the act is to prevent the importation of pure and unwholesome tea; that it is ridiculous and unreasonable to suppose that Congress intended by this legislation to permit the Secretary of the Treasury to determine the grade of tea which the American people were permitted to drink; that Congress could not confer upon the Secretary of the Treasury the power to declare what teas should be imported into the United States; that a wrong meaning has been given to the word "quality."

"The purpose of a standard is that there may be a fixed and stable measure by which smaller articles can be tested, but if by the word 'quality' Congress meant to place it in the power of the Secretary, of the Treasury to fix and establish the teas admissible into the United States according to their taste and flavour, then not only is it possible that the widest fluctuations may exist from year to year in fixing of the standards, but the determination of whether teas offered for import are inferior in flavour and taste to the standards so established must necessarily fluctuate with the varying skill or delicacy of taste of tea experts. It needs no argument to show that to subject an extensive trade in a commodity of foreign production which must be purchased many months in advance of its arrival at our ports, subject to the variations of seasons, to entry under such a rule is to imperil all security of trade and to put the merchant under a hazard of loss for which there can be no compensation of gain to any other part of the community. For even if such a construction of the statnte were not oppressive upon the importer, it would still be a harsh and unjust rule in its application to the consumer. It would exclude inferior grades of tea, although entirely genuine and wholesome, and would compel the poorer classes of citizens to purchase higher grades of tea presumably more costly and possibly less to their liking. To that extent it would interfere with the natural liberty of the citziens and the choice of commodities which it is the general policy of the law to extend rather than to restrict.

"If this be so the legislation is in the nature of a police regulation, and the word 'quality' is to be read as having regard to the tea as being fraudulent or deceptive or bad. The design of the statute, then, is to exclude 'impure,' 'trashy,' and 'unwholesome' tea.

"This in effect limits the word 'quality' by the purpose of the statute as we have claimed it, and by the words with which it is associated.

"The rejection of teas equal in purity, quality, and fitness for consumption because containing a greater mixture of similar teas broken up into fragments known as dust or fannings is unauthorized by the statute. The regulations provide that in certain standards the percentage of dust or fannings must be restricted to 10 per cent., and in others that the maximum of dust or fannings shall not exceed 4 per cent.

"It is entirely manifest that the inherent substance of the tea is not altered by its being broken into small fragments, nor is there any pretence that it is thereby rendered any less wholesome or fit for consumption. If these teas were properly rejected it must have been because the 'quality' refers not to the inherent substance of the tea, but to its size and packing. We submit that such a construction of the word 'quality' is inadmissible. It is strained and unnatural. It has no justification in the reason of the law or in the plain meaning of the words, and is merely a trade regulation absolutely unauthorised by the statute.

"The regulations require the rejection of teas not equal to the standard in flavor or cup quality, although equal to the standards in every other particular, and the defendants have applied and are applying that rule.

"The defendants having prevented the importation of teas which the plaintiff is entitled to import within the true intent and meaning of the act and threatening to continue to do so, should be enjoined from such unauthorized acts."—*American Grocer*, May 3.

REPORT ON THE DEPARTMENT OF LAND RECORDS AND AGRICULTURE, MADRAS.

The latest Report on this Department (1898-9) has reached our hands. The operations on the agricultural side of this Department are of interest to us just at this time when the question of establishing a Department of Agriculture in Ceylon is on the *tapis*. It will be remembered by some that the Ceylon School of Agriculture, as first established by Mr. H. W. Green, was to a great extent, modeled on the plan of the Madras College, while the contents of his "Primer of Agriculture for Ceylon Schools" was also compiled mainly from a work written by the Principal of that College. Whether the fact of the Colombo School having been established on the model of the Madras College explains an element of demerit or not we cannot say; but it has happened that not long ago the latter, like the former, was the subject of much adverse criticism. We note, however, in reading through the Report under review that a more liberal and up-to-date system of administration has superseded the old order of things in Madras, and we earnestly hope that the same change for the better will, before long, mark the progress of official, agricultural work in this island. For one thing, we are glad to find under the head of "Scientific and National Enquiry under Imperial Control," that Geological Surveying is going on apace in the Presidency, and we read of the examination of such minerals as corundum, iron ore and mica, with a view to developing the mineral resources of the country. The rest of the work of the Department falls under the heads of Meteorology; Botany (the examination of various vegetable products—edible and otherwise—from an economic point of view); Entomology; Chemistry (chemical examination of soils, plants, manures, etc.); Statistics (Agriculture); Veterinary (Animal Diseases, Breeding); Cryptogamy (fungoid diseases); besides the Control of Agricultural Education (including dairy farming), Agricultural publications, the holding of Shows, etc. We expect that in all these matters, the proposed Department or Board of Agriculture in Ceylon will find ample scope for work, to be undertaken, it is hoped, in the same liberal spirit in which it appears to be carried on by the authorities in the Madras Presidency. We would draw attention to the following reference to the employment of men trained in Agriculture :—

It has long been held in this Presidency that it would be advantageous if the staff of the Revenue, Forest, Educational and other Departments were leavened by men who had received a thorough course of instruction in Agriculture, and of late years this has been specially recognized by placing men who have obtained the diploma in Agriculture on an equal footing with B.A. candidates for employment in the Revenue Department. The report of the Principal of the College of Agriculture, for 1897-98, shows the extent to which this leavening has been effected. The total number of former students of the College who were employed in the Revenue Department at the close of the year was 102, 41 of them being Revenue Inspectors. In the Forest Department under Government, and elsewhere, 43 were employed, and in the Educational Department as teachers of Agriculture, 16, whilst the number engaged in direct connection with agriculture and veterinary practice was 98.

The income of the Madras Agri-Horticultural Society is, we are told, chiefly derived from the Government grant (R4,000). Would that the local Government could see its way to follow this example!

MIDLAND (CEYLON) TEA PLANTATIONS COMPANY, LIMITED.

The following is from the report of the directors:—The directors beg to submit the accounts, duly audited, or the year ending December 31, 1898, which they much regret to say again show results far from satisfactory, owing chiefly to the low prices obtained for Ceylon teas last year. The receipts for the season are £9,074 7s 1d; less working expenses in Ceylon, £7,329; leaving gross profit, £1,745 7s 1d; from which has to be deducted: Debenture interest—6 per cent. per annum on £15,000, £900; interest on loans, £269 7s 2d; fees to trustees, and auditors, and London agents' commission on teas sold, £234 2s 9d; general charges, &c., £75 12s 10d; and the following being also chargeable:—legal expenses in connection with the mortgages, £146 3s 7d; preliminary expenses, one-third written off, 1897, £133 5s 7d; ditto, 1898, £133 5s 7d; manure, cost written off, 1897, £193 5s 2d; rice, loss written off, 1897, £132 13s 9d, produce, over estimate written off, 1897, £34 15s 8d; auditors' fees, written off, 1897, £12 12s; the deficiency is as shown, £519 17s.

It will be seen there is no actual loss on the year's trading, but that the deficiency is caused by previous debits, and the legal expenses in connection with the mortgages to the trustees for the debenture-holders, and to the London agents. In consequence of the year's trading being so unfavourable, the directors have waived their fees, and the London agents, Messrs. M. P. Evans & Co., have made no charge for secretarial work and office rent. The tea sales for the season amounted to 381,940lb, the net average being 5·49d per lb. The rupee exchange was again higher, and averaged 1s 4·20d. The acreages under cultivation are: Over four years old, 938; under two years old, 49; total, 987 acres, and the crop for the current season is estimated at 380,000lb, of which there have been sold to date 29,880lb, at a net average of 7d per lb, a satisfactory advance on last year, and, as the prices now ruling in the London market for Ceylon teas are much higher than they have been for some time, the directors trust they may be able next season to present to the shareholders a statement of a more encouraging nature. It will be noticed that since the date of the last report the working capital of the company has been increased by £2,000 raised in preference shares. The company's visiting agent, Mr. W. R. Tatham, reports in a recent letter that the estates are in good order, and the bungalow and other buildings are in good repair. By his advice the directors have sanctioned a new clearing of thirty-one acres of land lying between Blackstone and Kenilworth, which are well adapted for the growth of tea. Mr. Tatham states that the work of clearing and draining is being carefully carried out by the superintendent, Mr. Campbell. —*H. & C. Mail*, May 26.

PRODUCE AND PLANTING.

THE DRAFT ON TEA.—This question is exercising the mind of the trade, and there is considerable opposition to the proposals for abolishing the draft allowance on tea at public auction in London. In the recent circular issued by the Indian Tea Association of London and the Ceylon Association of London, the signatures of growers and importers of Indian, Ceylon, Java, or China teas were invited to an agreement binding them to refuse the draft allowance to buyers in all tea sales after a fixed date. In an explanatory memorandum circulated with the form of agreement, one of the chief reasons advanced for making the proposed change is that the draft allowance "is a survival from times and conditions which no longer prevail." It is contended by the trade that the draft allowance is certainly a "survival" from old times, and this long-established custom ought not to be lightly set aside. The question raised, the "Grocer" points out, is one of considerable importance, affecting not only the Indian and Ceylon tea trade, but the tea trade in general. Retailers will naturally want to hear strong arguments before they endorse the Indo-Ceylonese proposal—stronger arguments, probably, than those advanced in the quoted memorandum. For example, it is said that what with draft and turn-of-scale allowance, buyers last year received "five-million pounds of tea more than they paid for." Surely that suggestion nullifies itself. People who buy do not usually receive more than they actually pay for, although they may receive more than they nominally pay for. We mean that if five million pounds of tea were handed over to buyers, that fact is large enough to show that their sellers did no more than they were properly expected to do; the prices paid were paid reckoning that fact in with them. Possibly the system of paying for the exact quantity bought may be a preferable one, but such a change as is proposed cannot justly be made unless all the parties concerned have their eyes open, so that the bearing of the change on future buying may be thoroughly understood. The real reason for the change is that set out in paragraph No. 1 in the memorandum namely, "the profit on tea cultivation having reached such a narrow margin." The growers in India and Ceylon have cut down there, and are now wishful to cut down here. We should not have thought the Indian and Ceylon trade had been really so bad as all that, though we can quite understand why cutting down should be attempted if people find themselves, or think themselves, strong enough to do it. According to the "Produce Markets' Review," this draft was not allowed for loss of weight only, but was intended to cover all sorts of other contingencies arising from the nature of the trade, such as the occasional refusal of any allowance for damage, false package, &c., after delivery from the public warehouses. Of course, also buying at original landed weights, the trade accept a great risk when delivery is delayed, as it often is, and they must have some margin in return.

NOT SO BAD AS IT LOOKS.—It might be thought on looking at the figures representing the Imports of Indian and Ceylon tea to the United States and Canada for the first three months of the year that the demand was on the decline in North America. For the correspondining periods in 1897 and 1898 the amounts respectively were 4,460,943 lb. and 3,155,099 lb., while for the first three months of the current year the quantity taken was only 2,935,885lb. The explanation is that in 1897 the imports were unusually large owing to the fear which then existed of an alteration in the tea duty in the States, while the slight reduction in the first quarter of the present year is attributed to the recent high prices.

PLANTING IN BRITISH CENTRAL AFRICA.—The revenue of the Brtish Central Africa Protectorate for the year ending March 31 last exceeded the estimate by several thousand pounds. The rainy season which has just come to a close has been a comparatively healthy one. Very few new planters settled in the Protectorate last year, but the area under coffee is constantly increasing, as also is the bearing capacity of the trees planted during recent years. There has been an increase in the export of rubber, but owing to the frequent bush fires British Central Africa is not an abundant rubber country, and is not likely to become a serious rival to Brazil or West Africa.—*H. and C. Mail*, May 26.

THE INDIAN TEA MARKET:

ANNUAL REPORT AND PROSPECTS.

THE annual report of Messrs. Carritt & Co. deals solely with Indian tea, and the greater portion has been forestalled so far as facts and figures are concerned in the earlier Broking reports. There are, however, a few passages which are worth taking over—for instance:—

The result of the past year's working has again been unsatisfactory to growers. The chief causes are to be found in the sameness of quality of a very large proportion of the crop, the unequal distribution of supply, the concentration of buying power in the London market and high exchange. The consistently low level of value, increased deliveries at home, together with the certainty of a crop practically the same weight as last year, and the uncertainty of a proportionately better price being obtainable, opposed the idea of curtailing outturn with a view to improving quality. The character of the crop, which has largely consisted of ordinary medium quality, has not tended to bring about any appreciable advance in sterling values, though, apart from other features of the trade, it should have been sufficiently good to maintain last year's level. Owing to improved facilities of transport, and also to accelerated services, the crop has reached the market quicker than usual; no adverse influences have temporarily impeded transit or have tended to check the rapid forwarding of supplies.

Next we have an altered condition of the trade dealt with and an evil of some magni-

tude affecting producers is certainly brought to light :—

The effect of a congested supply and the want of a more equable distribution of the crop on the home market has been more than ever emphasised this year. Improved means of carriage have been largely availed of (mainly on account of economy in finance), and tea has been rushed forward at headlong rate, regardless of the inevitable fate awaiting it in London. A more convincing proof of the need of a better regulation of supply cannot be wanted than this year's working affords; even the law of supply and demand has been suspended by the persistent pouring in of shipments, and any tendency to improved prices has been immediately stifled. The altered condition of the trade and the concentration of buying power in the hands of the comparatively few large London houses make it all the more necessary to feed the markets judiciously, and the absence of this precaution has never been brought home to the seller so acutely as in the past year. The continually depressed market at home and the difficulty in moving up sterling value, in spite of an exceptional position, are in a great measure directly attributable to this drawback, and so long as the annual flooding process supervenes no healthy recovery in values appears probable; they may slightly improve during the months of diminished supply but only to be forced down again when the weight of tea comes forward. That some effective scheme for ensuring a more uniform supply throughout the year than now exists would prove of enormous benefit to the industry is undoubted, but the difficulties to be overcome appear insurmountable; it would necessitate a strong combination of producing interests, and restricted dealings would probably be unacceptable to many. But prices have been forced down to such a low level, and the margin of profit to the grower, where it has not disappeared altogether, is so small and uncertain that any active measures with this object in view should receive every consideration.

Ceylon tea shipments, fairly distributed as they are over the year, do not give the same trouble as those from India—concentrated as the latter are—within a few months practically. But how to apply a remedy would puzzle even so great a capitalist and producer as Sir John Muir!

As regards "prospects," Messrs. Carritt & Co. write :—

Prospects for the ensuing season are brighter, and there are indications of a more prosperous year before the trade. That so large a portion of the crop should, under such abnormal conditions as existed during the past year, have been dealt with before any recovery in prices took place in London is instructive, and it is to be hoped that the measure of strength now acquired by producers will not be disturbed. The statistical position would seem to invite a freer supply, which in many cases would mean a coarser system of plucking and a consequent lowering of quality; under such conditions the outlook is not favourable. The past year's crop was by no means a full one, and with the increased yield during the current season from considerable extensions coming into bearing, there should, under normal conditions of weather be quite sufficient tea to meet home requirements, and also the increasing demands for outside markets. With a large and inferior quality crop, lower prices must be looked for, and any recovery in value (signs of which are now seen) cannot be maintained. As regards manufacture, the foregoing remarks may be some guide in deciding upon the best course to pursue. In the districts planters have been fully alive to the situation, and every effort on their part will doubtless be continued to attain the best results.

PLANTING NOTES.

Coffee.—On the 6th of May one or two suggestions were offered in this journal towards the devising of some means of popularising coffee amidst the millions of possible consumers who will prefer tea for the plain reason that nothing is wanted for that save the boiling of the kettle. It is disappointing to find that not one local planter, hard hit though the industry be, has yet had one idea to rub on another as to this most practical question.—*S. F. Press*, May 23.

Tea in Natal.—The consumption of tea per head in England (notes the *Agricultural Journal*) is 6lb. per annum. The production for Natal is computed at 1,000,000lb. per annum says the *Mercury*. The white population of Natal is 50,000; at 6lb. per head the consumption in Natal is 300,000lb per annum, leaving 700,000lb for export. The average retail price for tea in Natal is 1s 5d per lb; hence £21,250 is spent annually in tea by a population of 50,000.

"Colonia" for April is an interesting number. There are now some ten old students of the Colonial College (Suffolk) as tea planters in Ceylon. One of them notices the coincidence of three of them being connected with the one Company. We quote a paragraph :—

We had a visit during the Term from Mr. Youell Thorne who was back in the old country for a short time. He gave us pleasant accounts of life in Ceylon, and of the *Old Colonials* whom he had met there. Apropos of such meetings, the circumstance referred to by Mr. Beamish, in the Old Students' Column, of three College men coming together on the same estate is certainly noteworthy. Every one will wish the trio long life and prosperity, and a flourishing tea plantation of their own by and bye.

United Planters' Association of the Federated Malay States.—One interested in the Straits asks us if we have seen the Report of the latest meeting of this body "at which Mr. E. V. Carey has been elected Chairman by a large majority,—Ceylon again to the front." A copy of the Minutes or Report has been sent to us direct and it exhibits a good deal of enterprise on the part of the Straits planters. Mr. Carey succeeds another Ceylon man, Mr. T. H. Hill, as Chairman of the U.P.A. The Association is anxious to get an "Agricultural Department" established in the Straits for the general benefit of the inhabitants, and to this end it has been collecting information from the different Colonies with regard to botanical and agricultural departments, making, however, a big blunder in giving Ceylon credit for a general revenue of 19 million £ sterling in place of rupees,—a misprint, of course.—Mr. Coates was thanked for collecting information respecting the cultivation, transport, &c., of coffee in Brazil; but surely European (and ex-Ceylon) planters in the Straits have little to learn from South America in respect of coffee? The Straits planters are anxious to have a Bonded Store or Warehouse for their produce, in order that their coffee may have time to mature (!) and in the meantime that advances may be obtained,—rather dangerous business for a Government to meddle with. The "labour" question is always a lively one in the Straits, and in a variety of forms it is freely discussed in the present Report.

Ceylon Rainfall.

THE P. W. D. METEOROLOGICAL OBSERVATIONS FOR MAY 1899.—We append this Monthly Return of rain from which it will be seen that the highest fall was at Padupola in the Central Province, 32·46 inches, and the lowest at Elephant Pass in the Northern Province 0·14 inch.

WESTERN PROVINCE.

Negombo, Mr. Bucknall (6) ... 8·96
Kalutara Mr Gregson (36) 29·71
Labugama, Mr Bond (369) ... 21·51
Henaratgoda, Mr. Silva (33) ... 16·04

CENTRAL PROVINCE.

Katugastota, Mr. Morgan (1,500) .. 9·84
New Valley, (Dikoya) Mr. Ward (3,708) .. 24·06
Helboda, (Pussellawa) Not received (3,300) ... —
Yarrow Estate, Mr. Peto (3,400) ... 13·27
Peradeniya Mr. MacMillan (1,540) ... 7·59
Duckwari, Mr. Spence (3,300) ... 6·73
Caledonia, Mr Goork .. (4,273) ... 13·63
Pussellawa, Mr. Powell (3,000) .. 15·51
Hakgala, Mr. Nock (5,581) .. 8·92
S. Wanarajah Estate, Mr. Tatham (3,700) ... 21·30
St. Andrew's (Maskeliya,) Not received (4,200) ... —
Padupola, Mr. Ward ... (1,636) .. 32·46
Mylapitiya, Mr. Fletcher (1,707) ... 1·51

NORTHERN PROVINCE.

Mullaittivu, Mr. Sanmukam (12) . 2·73
Jaffna Mr MacDonnell (8) 2·36
Mankulam, (N. Road) Mr. Walker (167) .. 1·85
Elephant Pass, Mr. Silva (7) .. 0·14
Vangalachettykulam, Not received (179) ... —
Point Pedro, Mr. Pararachasinghe (24) .. 1·61
Jaffna College, Mr. Cooke (9) ... 1·83
Kayts, Mr. Kretser ... (8) .. 1·98
Kankesanturai, Mr. Adams (10) . 1·67
Pallai, Mr. Silva (24) .. 2·00
Murlkandy, (North-Central Road) Mr. Silva — 1·00
Nedunkeni, Mr. Sanmukam (122) ... 3·57
Chavakachcheri, Mr. Silva (16) ... 0·98
Udupiddi, Mr. Hastings (35) ... 2·03
Marichchukaddi, (14) Not received ... —
Murungan, Mr. Blechingberg — 4·06
Vavuniya Mr. Walker (318) 6·65

SOUTHERN PROVINCE.

Ella Vella (262) Mr. Adams 13·50
Kekauadura, (150) do 12·28
Denagama, (286) do 11·90
Udukiriwila Mr. Lourensz (235) ... 5·99
Kirama, Mr. Ismail (260) 7·04
Hali-ela (200) Mr. Adams 16·10
Tissamaharama, Not received (75) ... —
Matara (15) Mr. Adams 11·40
Dandeniya, (157) do 12·20
Urubokka, (890) do 14·70
Elagala, Not received (121) —
Tangalla, (94) Mr. Bartlett 5·87
Mamadola, Mr. Cade (56) ... 4·30

EASTERN PROVINCE.

Irrakkamam, (42) Mr. Bower 1·62
Devilana, Mr. Vanderstraaten (136) Nil
Sagamata, Mr. Bower (40) ... Nil
Ambare, do (65) 0·65
Kanthalai, Mr. Carte (150) 0·52
Allai, Mr. Carte (95) Nil
Rukam, Mr. Vanderstraaten (120) .. Nil
Periyakulam, Mr. Carte (20) ... Nil
Chadaiyantalawa, Mr. Edge (57) ... 2·11
Kalmunai, do (12) 0·38
Rotewewa, do (30) 0·21
Lahugala, do (70) 2·00
Naulla, do (30) 0·50
Andankulam, Mr. Carte (41) ... Nil
Manalpuddy, Mr. Vanderstraaten (21) 0·40
Maha-Oya-Tank, Mr. Vanderstraaten (190) Nil

N.-W. PROVINCE.

Magalawewa, Mr. Soopprayan (176) .. 5·45
Maha Uswewa tank, Mr. Crabb (160) ... 5·21
Tenepitiya, Mr. Simmons (8) ... 10·65
Batalagoda, Mr. Parker ... 6·06

N. C. PROVINCE.

Kalawewa, (268) Not received
Maradankadawala, Mr. Carson (443) ... 5·65
Mihintale, Mr Silva (354) ... 5·41
Horowapotaua, Mr. Silva (217) ... 3·38
Madawachchiya, Mr. MacBride (285) ... 4·36
Topare, (200) Not received ... —
Minneriya — Mr. Eves 3·92

UVA PROVINCE.

Bandarawela, Mr. Tocke (4,380) ... 5·41
Haldummulla, Mr. Viramuttu (3,160) ... 3·95
Kumbukan, (446) Mr. Emerson ... 1·03
Koslanda, (2,258) Mr. Emerson ... 3·37
Tanamalwila, Not received (550) ... —

SABARAGAMUWA.

Ambanpitiya, Mr. Caldicott (729) 10·05
Pelmadulla, Mr. Jeffery (408) 18·48
Kolonna Korale (Hulanda-oya) (203) Not Received —
Avisawella, Mr. Jeffery (105) 17·95

Ceylon Rainfall.

S. G. O. METEOROLOGICAL OBSERVATIONS FOR JANUARY 1899.

We append the total fall of rain from which it will be seen that the highest fall was at St. Martins, Rangalla, 55·86 inches, and the lowest at Orange Hill, Ragama, 1·55 inches.

Colombo (40) 6·98
Ratnapura (34) 4.04
Puttalam (27) 10·44
Anuradhapura (295) 5.19
Mannar (12) 2·53
Jaffna .. 2·11
Trincomalee (12) 7·25
Batticaloa (26) 14·75
Hambantota (50) 10·95
Galle (48) 5·52
Kandy (1,654) 8·54
Nuwara Eliya (6,188) 12·62
Hakgala, Nuwara Eliya (5,581) 6·74
Badulla (2,225) 16·51
Vavuniya (317) —
Kurunegala (381) 7·12
Maligakanda, Colombo Mr Johnson (70) 3·93
Agricultural School Colombo, Mr. Rodrigo 4·43
Wilhelmina Puttalam, Mr. Ratnayeke (131) 9·38
Horakele Estate, Chilaw, Mr. Beven (50) 5·72
Chilaw Kachcheri Chilaw, Mr. Koch (10) 5·69
Franklands Estate Veyangoda, Mr. Beven 2·25
Orange Hill, Ragama Mr. Bassey (20) 1·55
Henaratgoda Gardens, Henaratgoda, Mr. de Silva (33) 3·71
Kotua Godella, Rambk'a Mr. Windus (580) 4·02
Eadella or Liberia Estate Polgahawela Mr. Kynaston (475) 5·72
Geekianakanda, Neboda Mr. Corrie (200) 8·43
Polgahakanda, Neboda Mr. Bury (500) 8·12
Labugama, Hanwella, Mr. Samarakone (369) 5·35
Rayigam, Horana, Mr. Hanan, (10) 9·65
Kanangma, Avissawella Mr. Cooke (200) 6·12
Dunedin Estate, Avissawella, Mr Bayley, (400) 6·09
Digalla Avisawella, Mr. Tottenham, (400) 3·95
Pambagama, Avisawella, Mr Bridgman (600) 3·39
Avisawella Estate Avisawella Mr. Byrde 250 4·04
Yatideriya, Kegalla, Mr. Fairweather ... 6·29
Mahawalatenna, Balangoda Mahawalatenna R.M. ... 4·80
Agrslsnd Estate Balangoda Mr Boyd (2,115) 3·72
Maduwanwala, Rakwana, Maduwanwela R.M. (750) 6·10
Anninkanda, Morawaka, Mr. Woodhouse (1,400) 8·34
Panilkanda, Morawaka, Mr. James (1,900) 1·82
St John Del Rey, Bogawantalawa, Mr. Glanville (4,300) 2·96
Friedland, Bogawantalawa Mr. Rammell (5,200) 5·21
Campion, Bogawantalawa, Mr. Gidden (4,840) 4·71
Blair Athol, Dikoya, Mr. Lane (3,641) 5·88
Annfield, Dikoya, Mr. Knight (4,700) 5.01
Maskeliya Hospital, Maskeliya Mr. Oorloff (4,200) 4·02
Hope Estate, Hewaheta, Mr. Bagot (5,000) 22·47
Coldstream Estate, Watawala Mr. Jones (3,800) 4·61
Holmwood Est., Agrapatana, Mr. Bosanquet (5,240) 3·78
Sandringham, Agrapatana Mr. Orchard (5,200) 4·15
Gingran-oya, Kotmale, Mr. Cox (3,800) 6·86
Labookelle, Ramboda, Mr. Stone (5,000) 12·88
Dunsinane, Pundalu-oya, Mr. Metcalfe 4,800 6·77
Sogama, Pussellawa, Mr. Eustace (3,500) 8·61
Kurundu-oya, Maturata, Mr. Owen (5,150) 26·87
Kabaragalla, Maturata, Mr. Maclean (4,200) 20·94
Maragalla Estate, Moopana, Mr. Betts, (2,200) 18·01
Moopana, Hospital, Moopana (Mr. Thomasz) (600) 14·24
Madulsima Hospital Lunugala Dr. Veithecan (2,600) 15·78
Meeriabedda, Haputale, Mr. Dupuis (3,600) 8·88
Udahena Estate, Haputale, Mr. Coombe (4,500) 10·98
Post Office, Bandarawela, Mr Rodrigo (4,036) 9·52
Callander, Ohiya Mr. Green (5,125) 10·42
Mariawatte, Gampole Mr. Salmond (1,600) 5·51
Orwell Estate, Gampola Mr. Taylor (1,800) 5·06
New Forest, Deltota, Mr. Wardrop (3,500) 13·34
Rajawella, Estate, Teldeniya Mr. Sinclair (1,500) 9·62
Lower Stirling Valley, Badulla Mr. Rettle (3,650) 21·94
Gourakele Estate, Badulla, Mr. Hope (1,200) 17·96
Monsagala Estate, Badulla, Mr. Deaker (4,500) 20·87
Ledgerwatte, Badulla Mr. Rettie (4,000) 30·86
Dea Ella Estate, M'walatenua Mr. Vanderslott (800) 10·41
Sembawatte Estate, N'pitiya Mr. Roe (1,600) 5·05
Gammaduwa, Estate, Rattota Mr. Westland (2,400) 40·04
Kobonella Estate, Rangala, Mr. Pole (3,300) 44·25
St. Martins, Rangala, Mr. Wyllie (3,600) *55·86*
Crystal Hill, Matale, Mr. Van S'rex (1,400) 15·79
Vicarton Estate, Matale Mr. Carrie (3,250) 19·43
Matale Mr. Tisseverasinghe (1,208) 13·08
Wariapolla, Matale, Mr. Dickenson (1,200) 13·51
Dambulla, Mr. Simeamby (400) 18·49
Kotta Estate, Pallal, Mr. Todd (13) 1·90
Mantota Hospital, Mannar, Mr. Ratnampilla (17) 1·69
Buttala Hospital, Buttala, Mr. Bulner .. 11·54
Police Station, Hatton Police Constable Miskin (4,141) 4·58
Nilaveli, Trincomalee, Mr. Abraham, .. 8·99
Delwita, Kurunegala, Mr. Neame (490) 10·82
Woodside, Uragalla Mr. MacMahon (3,000) 26·44
Gillardstown, Watiegama Mr. Hardy (2,500) 14·96

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Name of Company.	Amount paid per share.	Buyers.	Sellers.
Agra Ouvah Estates Co., Ltd.	500	—	950
Ceylon Tea and Coconut Estates	500	—	500 n'l
Castlereagh Tea Co., Ltd.	100	97½	100
Ceylon Hills Estates Co., Ltd.	100	—	30
Ceylon Provincial Estates Co.	500	500*	500
Claremont Estates Co., Ltd.	100	15	..
Clunes Tea Co., Ltd.	100	—	95
Clyde Estates Co., Ltd.	100	—	90
Delgolla Estates Co., Ltd.	400	—	150
Doomoo Tea Co., of Ceylon, Ltd.	100	65	—
Drayton Estate Co., Ltd.	100	135	—
Ella Tea Co., of Ceylon, Ltd.	100	50	50*
Estates Co., of Uva, Ltd.	500	—	350
Gangawatta	500	.	—
Glasgow Estate Co., Ltd.	500	962½	—
Great Western Tea Co., of Ceylon, Ltd.	500	642½	640
Hapugahalande Tea Estate Co Ltd.	200	..	250
High Forests Estates Co Ltd	500	550	550
Do part paid	350	385*	—
Horekelly Estates Co., Ltd.	100	..	90
Kalutara Co., Ltd.	500	..	400
Kandyan Hills Co Ltd.	100	—	47½
Kanapediwatte Ltd.	100	—	90
Kelani Tea Garden Co., Ltd.	100	...	65
Kirklees Estates Co., Ltd.	100	140	—
Knavesmire Estates Co., Ltd.	100	..	77·50
Maha Uva Estates Co., Ltd	500	—	575
Mocha Tea Co., of Ceylon, Ltd.	500	—	700
Nahavilla Estate Co., Ltd.	500	—	500*
Nyassaland Coffee Co. Ltd.	100	..	90
Ottery Estate Co., Ltd.	100	110	—
Palmerston Tea Co., Ltd.	500	..	425
Penrhos Estates Co., Ltd.	100	100	110
Pine Hill Estate Co., Ltd.	60	—	50
Pitakanda Tea Company	500	1,000	—
Putupaula Tea Co., Ltd.	100	..	100 n'l
Ratwatte Cocoa Co., Ltd.	500	350	500
Rayigam Tea Co., Ltd.	100	50	...
Roeberry Tea Co., Ltd.	100	55	60
Ruanwella Tea Co., Ltd.	100	...	75
St. Heliers Tea Co., Ltd.	5 0	505	—
Talgaswela Tea Co., Ltd.	100	—	32·50
Do 7 per cent. Prefs.	100	70	..
Tonacombe Estate Co., Ltd.	500	—	450
Udabage Estate Co., Ltd.	100	..	65 n'l
Udugama Tea & Timber Co., Ltd.	50	..	10
Union Estate Co., Ltd.	500	300	—
Upper Maskeliya Estate Co., Ltd.	500	..	500
Uvakellie Tea Co., of Ceylon, Ltd.	100	...	70
Vogan Tea Co., Ltd.	100	90*	—
Wanarajah Tea Co., Ltd.	500	1100	1150
Yataderiya Tea Co., Ltd.	100	—	375

CEYLON COMMERCIAL COMPANIES.

Name of Company.	Amount paid per share.	Buyers.	Sellers.
Adam's Peak Hotel Co., Ltd.	100	..	60
Bristol Hotel Co., Ltd.	100	..	85
Do 7 per cent Debts.	100	102·50	—
Ceylon Gen. Steam Navgt. Co., Ltd.	100	195	—
Colombo Apothecaries Co., Ltd	100	125	125*
Colombo Assembly Rooms Co., Ltd.	20	..	12·50
Do prefs.	20	..	17
Colombo Fort Land and Building Co., Ltd.	100	80*	..
Colombo Hotels Company	100	—	280*
Galle FaceHotel Co., Ltd.	100	—	167·50 n'l
Kandy Hotels Co., Ltd.	100	80	87·50
Kandy Stations Hotels Co.	100	..	40
Mount Lavinia Hotels Co., Ltd.	500	..	400
New Colombo Ice Co., Ltd.	100	—	162
Nuwara Eliya Hotels Co., Ltd.	100	35*	35
Public Hall Co., Ltd.	20	15	—
Petroleum Storage Co.	100	-	—
Do 10 % prefs.	100	35	40
Wharf and Warehouse Co., Ltd.	40	82·50	—

* Transactions.

LONDON COMPANIES.

Name of Company.	Amount paid per share.	Buyers.	Seller
Alliance Tea Co., of Ceylon, Ltd.	10	8¾—9	—
Associated Estates Co., of Ceylon Ltd.	10	..	6½—7
Do. 6 per cent prefs.	10	..	10—10
Ceylon Proprietary Co.	1	..	12·6—15¼
Ceylon Tea Plantation Co., Ltd.	10	..	26½—27
Dimbula Valley Co., Ltd.	5	—	6—6½
Do prefs.	5	—	5½—6 xd
Eastern Produce and Estates Co., Ltd.	5	..	6½—6¾
Ederapolla Tea Co., Ltd.	10	..	8—9
Imperial Tea Estates Ltd.	10	..	6½
Kelani Valley Tea Asson., Ltd.	5	..	5—6
Kintyre Estates Co , Ltd.	10	.	8½
Lanka Plantation Co , Ltd.	10	4½	..
Nahalma Estates Co., Ltd.	1	.	½—1
New Dimbula Co., Ltd. A	10	..	22-23
Do B	10	..	20·21
Do C	10	..	15—20
Nuwara Eliya Tea Est. Co., Ltd.	10	..	10¼
Ouvah Coffee Co.,Ltd.	10	..	5½—6¼
Ragalla Tea Estates Co., Ltd.	10	..	10½
Scottish Ceylon Tea Co., Ltd.	10	..	15
Spring Valley Tea Co., Ltd	10	..	5-6 nom.
Standard Tea Co., Ltd.	10	..	12½—13
Yatiyantota Ceylon Tea Co., Ltd.	10	—	7¼
Yatiyantota pref. 6 o/o	10	..	9¾—10

BY ORDER OF THE COMMITTEE.

Colombo, 23rd June, 1899.

RAINFALL RETURN FOR COLOMBO.

(Supplied by the Surveyor-General.)

	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897	1898	Av. of 29yrs.	1899
	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch	Inch	Inch	Inch.	Inch.
January ..	0·81	1·45	7·39	5·42	0·62	5·00	2·92	3·81	2·32	3·09	6·98
February ..	4·36	2·81	5·32	2·36	0·52	0·81	0·35	1·68	1·98	1·90	2·78
March ..	5·34	9·43	1·52	5·15	7·44	1·84	5·64	3·66	4·21	4·92	0·88
April ..	14·27	5.93	13·92	20·39	12·51	9·34	5·93	10·97	22·81	11·47	6·66
May ..	6·48	17·65	3·00	10·32	3·00	10·09	9·31	8·30	5·80	11·89	17·73
June ..	1·87	9.79	6·62	11·01	11·32	13·99	8·37	10·14	10·94	8·34	7·61*
July ..	3·32	4·59	1·10	2·20	1·72	0·52	2·85	5·24	6·15	4·49	
August ..	0·73	1·65	1·86	1·01	0·86	0·92	6·35	9·09	0·97	3·77	
September ..	1·50	4·42	1·14	1·99	0·78	4·09	10·99	4·58	6·90	5·13	
October ..	13·33	35·28	12·24	5·59	20·81	30·36	16·78	4·71	20·60	14·57	
November..	12·32	18·37	5·86	18·10	14·63	5·83	19.81	11·66	17·38	12·80	
December..	8·47	7·66	0·86	·13	3·25	9·44	11·76	8·89	3	6·45	
Total..	72·80	119·03	60·83	89·67	77·46	92·23	101·06	82·7	103·11	88·82	42·63

* From 1st to 27th June 7·61 inches, that is up to 9·30 a.m., 28th June.—ED. C.O

HOW TO CHOOSE ORANGES.—The sweetest oranges generally have rusty-looking coats. An English expert says:—"Pick out the dingiest in the box, and you will get the best." Another test is weight. The heaviest oranges have the thinnest rinds. Thick-skinned fruit is apt to be dry inside. A slight freezing on the tree causes this condition in otherwise fine fruit. The "kid-glove" oranges are the two varieties grown in Florida from stocks respectively brought from China and Tangier. The Glen Retreat orange of Queensland is a very fine-skinned heavy orange, and is amongst the best, if not the best of our mandarins.—*Queensland Agricultural Journal.*

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

Colombo, June 27th, 1899.

EXCHANGE ON LONDON :—Closing Rates: *Bank Selling Rates* :—On demand 1/4 to 1-32; 4 months' sight 1/4 1-32 to 1-16; 6 months' sight 1/4 1-16 to 3-32.

Bank Buying Rates:—Credits 3 months' sight 1/4 5-32 o 3-16; 6 months' sight 1/4 ¼ to 9-32; Docts 3 months' sight 1/4 3-16 to 7-32; 6 months' sight 1/4 9-32 to 5-16.

Indian Bank Minimum Rates 5 o/o

Local Rates: 1 o/o to 2 o/o Higher.

COFFEE :—

Plantation Estate Parchment on the spot per bus—R13.00

Plantation Estate Coffee, f.o.b on the spot per cwt R74·00

Liberian Parchment on the spot per bus—none

Native Coffee f.o.b per cwt. R43·50 Scarce and nominal

TEA:—Average Prices ruling during the week—Broken Pekoe per lb. 43c. Pekoe per lb. 36c. Pekoe Souchong per lb. 33c. Broken Mixed and Dust per lb. 26c.—Averages of Week's sale.

CINCHONA BARK:—Per unit of Sulphate of Quinine per lb 7½c. 1 o/o to 4 o/o

CARDAMOMS:—Per lb R1.85

COCONUT OIL:—Mill oil per cwt. R13.75

Dealers' oil per cwt. R13.75; Coconut oil in ordinary packages f.o.b. per ton R312,50

COPRA:—Per candy of 560 lb. R45.00

COCONUT CAKE:—(Poonac) f.o.b. (Mill) per ton, R80.00

Cocoa unpicked & undried, per cwt. R46.00

Picked & Dried f. o. b. per cwt. R47.50

COIR YARN.—Nos. 1 to 8 { Kogalla R17.25 / Colombo R16.00

CINNAMON :—Nos. 1 & 2 only f.o.b. 65c.

Do Ordinary Assortment. per lb 57c.

EBONY.—Per ton.—Govt. sales 30th June.

PLUMBAGO:—Large Lumps per ton, R1000

Ordinary Lumps per ton, R850

Chips per ton, R650 Dust per ton, R450

RICE.—Soolye per bag, R7.35 to 7.68

„ per bushel, R2.85 to 3.05

Pegu & Calcutta Calunda per bushel. R2.90 to 3.00

Coast Calunda per bushel, R2.95 to R3.10

Mutusamba per bushel R3.35 to 3.75

Kadapa and Kuruwe, per bushel—None.

Rangoon, raw 3 bushel bag. R9.37 to 10.00

Coast Kara per bushel R2.90 to 3.00

Soolai Kara per bushel R2.80 to 2.85

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)

Colombo, June 27th, 1899.

COFFEE :—

Estate Parchment :—per bushel	R11·00 to 12·00	scarce
Chetty do do	R8·00 to 9·00	scarce
Native Coffee do F. O. B per cwt.	R35·00 to 40·00	
Liberian coffee:—per bushel	R3·50	
do cleaned coffee:—per cwt	R22·50	
Cocoa unpicked:—per cwt	R40·00 to 42·00	
do cleaned do	R42·00 to 46·00	
Cardamoms Malabar per lb.	R1·10 to 1·30	
do Mysore do	R1·60 to 2·00	

RICE:

Soolai per bag of 164 lb. nett	R7 35 to 7·68
Slate or 1st quality:—per bushel	R2·95 to 3.05
Soolai 2 & 3rd. do do do	R2·85 to 2·95
Coast Calunda	R2·95 to 3·10
Coast Kara	R2·90 to 3·00
Kazala	R2·80 to 2·85
Muttusamba Ordinary	R3·35 to 3·75
Rangoon Rice per bag	R9 37 to 10·00
Cinnamon, per lb No 1 to 4	R00·57
do do 1 to 2	R00·64
do Chips per candy	R90·00 scarce
Coconuts Ordinary per thousand	R35·50 to 37·50
do Selected do	R36·00 to 38·50
Coconut Oil per cwt	R14·12½ to 14·25
do do F. O. B. per ton	R282·50 to 285·00

POONAC:—

Gingelly per ton		R85·00 to 90·00
Coconut Chekku	do	R75·00 to 80·00
do Mill (retail)	do	R75·00 to 80·00
Cotton Seed	do	R60·00

POONAC.—

Copra per candy	R45·50
Kalpitiya do	R43·00 to 44·50
Marawila do	R40·00 to 42·00
Cart Copra do	R2·00 to 2·25
Satinwood per cubic feet	R5·00 to 6·00
do Flowered do	R1·90
Halmilla do	R1·00 to 1·12
Palu do	R75·00 to 175·00
Ebony per ton	R30·00
Kitul fibre per cwt	R8·00 to 17·50
Palmyra do do	none.
Jaffna Black Clean per cwt	R12·00 to 13·00
do mixed do	R8·00 to 13·50
Indian do	R10·00 to 17·50
do Cleaned do	R47·50 to 52·50
Sapanwood per ton	R6 25 to 6·50
Kerosine oil American per case	R2·75 to 2·90
do bulk Russian per tin	none
do Sumatra per Cases	R2 00 to 3·50
Nux Vomica per cwt	R38·00 to 40·00
Croton Seed per cwt	R24·00 to 25·00
Kapok cleaned f o b do cwt	R8·00 to 9·00
do uncleaned do	
Plumbago' per ton, according to grade — Large lumps	R500·00 to 900·00
do	R400·00 to 850·00
Chips	R200·00 to 650·00
Dust	R100·00 to 450·00

CEYLON EXPORTS AND DISTRIBUTION. 1899.

COUNTRIES.	Tea. 1899 lbs.	Tea. 1898 lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cinchona Branch & Trunk lb. 1899. lbs.	Cinchona Branch & Trunk lb. 1898 lbs.	Cocoa cwts.	C'moms lbs.	Cinnamon. Bales lbs.	Cinnamon. Chips lbs.	Coconut Oil. 1899 cwts.	Coconut Oil. 1898 cwts.
To U. K. ..	47740778	47992114	4764	..	4764	320835	310984	23503	198639	215746	424037	49422	41577
„ Austria ..	4749	6812	1	...	1	..	...	...	..	...	105926	851	4124
„ Belgium ..	8883	6110	61	..	61	...	...	131	58	47260	87360	404	903
„ France ..	52491	34805	165	..	165	33	18794	3	..	42066	1750	..	4008
„ Germany ..	196843	150287	19	..	19	..	..	...	16860	131921	319551	401	5567
„ Holland ..	4670	6846	..	..	...	..	..	..	...	...	...	..	..
„ Italy ..	8089	2450	..	..	...	..	...	...	20	48300	100320	205	..
„ Russia ..	1700164	1198555	24	..	24	...	...	..	..	..	...	..	..
„ Spain ..	5800	20150	..	..	..	...	...	..	..	113400	12600	..	..
„ Sweden ..	23746	18534	..	..	...	..	...	...	4036	500	..	206	...
„ Turkey ..	10202	10391	1	..	1	..	..	...	..	...	..	..	..
„ India ..	209921	557762	44	..	44	..	...	1	27854	...	...	121583	49085
„ Australia ..	6690200	7312110	1844	..	1844	...	...	61	...	3600	13440	373	325
„ America ..	1085451	804465	292	...	292	94005	63188	472	4753	50600	28000	47963	19707
„ Africa ..	131019	213356	..	..	...	..	724	..	56	400	1240	...	..
„ China ..	469638	453021	28	..	28	...	2026	...	1388	25000	...	2880	1854
„ Singapore ..	28907	26554	77	..	77	..	..	...	480	..	...	17812	50132
„ Mauritius ..	17420	7300	..	..	...	..	...	..	..	..	..	..	..
„ Malta ..	124227	81129	..	..	..	...	..	..	..	..	..	..	..
Total export from 1st Jan to 27th June, 1899	58513198	58902751	7320	..	7320	414873	395716	24171	254144	678793	1094221	142100	177282

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, May 17th, 1899.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ...	44s a 100s
Zanzibar & Hepatic ,,	Commou to good ...	11s a 80s
BEES' WAX, ,,		
Zanzibar & Bombay White ,,	Good to fine	£7 a £7 10s
Zanzibar & Bombay Yellow ,,	Fair ,,	£5 15s a £6 10s
Madagascar ,,	Dark to good palish	£6 5s a £6 12s6d
CAMPHOR, China ,,	Fair average quality	130s
Japan ,,	,, ,, ,,	132s 6d
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 9d a 3s
	Middling, stalky & lean	2s a 2s 3d
Ceylon.—Mysore ,,	Fair to fine plump ..	3s a 3s 8d
	Seeds ...	2s 4d a 2s 7d
,, Tellicherry ,,	Good to fine ...	2s 11d a 3s
	Brownish ..	2s 6d
,, Long ,,	Shelly to good ...	3s a 3s 9d
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 9d
CASTOR OIL, Calcutta ,,	1sts and 2nds ...	3½d a 4½d
Madras ,,	...	3½d a 3¾d
CHILLIES, Zanzibar cwt.	Dull to fine bright ..	29s 6d a 40s
CINCHONA BARK.—		
Ceylon lb.	Crown, Renewed	5d a 7d
	Org. Stem	8⅞d
	Red Org. Stem	2¼d a 3¼d
	Renewed	3½d
	Root	4⅝d
CINNAMON, Ceylon 1sts	Ordinary to fine quill	9d a 1s 6d
per lb. 2nds	,, ,,	8d a 1s 4d
3rds	,, ,,	7½d a 1s 3d
4ths	,, ,,	7d a 11d
Chips	,, ,,	3d a 4½d
CLOVES, Penang lb.	Dull to fine bright bold	4¼d a 1s
Amboyna ..	Dull to fine	4d a 5¼d
Zanzibar and Pemba	Good and fine bright	3½d a 4½d
	Common dull to fair	3¼d a 3 7-16d
Stems ..	Fair	2d
COCULUS INDICUS cwt.	Fair	9s
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	110s a 120s
	Middling to fine mid ..	103s a 108s
	Low mid. and low grown	90s a 100s
	Smalls	58s a 82s
Native ,,	Good ordinary	30s a 70s
Liberian ,,	Small to bold	28s a 37s
COCOA, Ceylon ,,	Bold to fine bold	74s a 80s
	Medium and fair	68s a 73s
	Triage to ordinary	50s a 67s
COLOMBO ROOT ,,	Ordinary to good	11s a 19s 6d
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£16 a £20
FIBRE, Brush ,,	Ord. to fine long straight	£10 a £21
Cochin ,,	Ordinary to good clean	£18 a £22
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £33
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	40s a 55s
CUTCH ,, ,,	Fair to fine dry	28s a 35s
GINGER, Bengal, rough ,,	Fair	20s
Calicut, Cut A ,,	Good to fine bold	70s a 75s
B & C ,,	Small and medium	28s 6d a 46s
Cochin Rough ,,	Common to fine bold	21s a 26s
	Small and D's	17s a 20s
Japan ,,	Unsplit	17s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	20s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £15
	Part yellow and mixed	£8 2/6 a £10 10s
	Bean and Pea size ditto	70s a £8 12/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	40s a 55s
Turkey sorts ,,		70s a 85s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ...	27s 6d a 35s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	37s a 80s
	Ord. stony and blocky	25s a 47s 6d
KINO ,,	Fine bright	7s
MYRRH, picked ,,	Fair to fine pale	65s a 75s
Aden sorts ,,	Middling to good	33s a 55s
OLIBANUM, drop ,,	Good to fine white	36s a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	16s a 20s
siftings ,,	Slightly foul to fine	16s 6d a 18s
INDIARUBBER, Assam lb	Good to fine	2s 10½d a 3s 3½d
	Common to foul & mxd.	1s 9¾d a 2s 9d
Rangoon	Fair to good clean ...	2s 9d a 3s 2d
	Common to fine	1s a 2s 4d

	QUALITY	QUOTATIONS
INDIARUBBER, (Contd).		
Java, Sing. & Penang lb.	Foul to good clean ...	8d a 3s 4d
Mozambique ,,	Good to fine Ball ..	3s 5d a 3s 8¾d
	Ordinary to fair Ball ..	2s 3d a 3s 2½d
	Low sandy Ball ..	1s 6d a 1s 9d
	Sausage, fair to good	3s 4½d a 3s 8d
	Liver and livery Ball ..	2s 9d a 3s 3½d
Madagascar ,,	Fr. to fine pinky & white	3s 4d a 3s 5¾d
	Fair to good black ...	2s a 2s 7½d
	Niggers, low to good...	1s 4¾d a 2s 10¾d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	3s 2d a 4s 6d
	Consuming mid. to gd.	3s a 3s 8d
	Ordinary to mid.	2s 2d a 2s 10d
	Mid. to good Kurpah	1s 10d a 2s 8d
	Low to ordinary	1s 8d a 1s 9d
	Mid. to good Madras	1s 7d a 2s 6d
MACE, Bombay & Penang	Pale reddish to fine	2s a 3s
per lb.	Ordinary to fair	1s 5d a 1s 11d
	Pickings	1s 1d a 1s 3d
MYRABOLANES, Madras cwt	Dark to fine pale UG	6s a 6s 6d
	Fair Coast	4s 6d
Bombay ,,	Jubblepore	4s 3d a 6s
	Bhimlies	4s 9d a 10s
	Rhajpore, &c.	4s 3d a 9s
Bengal ,,	Calcutta	4s 6d a 7s
NUTMEGS— lb.	64's to 57's	2s 4d a 2s 6d
Bombay & Penang ,,	110's to 65's	1s 1d a 2s 3d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	12s a 18s
NUX VOMICA, Bombay	Ordinary to middling	4s a 5s 6d
per cwt. Madras	Fair to good bold fresh	8s a 10s
	Small ordinary and fair	5s 6d
OIL OF ANISEED lb	Fair merchantable	6s
CASSIA ,,	According to analysis	3s 11d a 5s 6d
LEMONGRASS ,,	Good flavour & colour	2¾d a 2⅞d
NUTMEG ,,	Dingy to white	3d a 3½d
CINNAMON ,,	Ordinary to fair sweet	3¼d a 1s 6d
CITRONELLE ,,	Bright & good flavour	11½d a 1s 0½d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody .	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ..	10s a 15s
	,, wiry Mozambique	10s a 11s
PEPPER - (Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ..	5¼d a 5¼d
Singapore ...	Fair	5⅜d
Acheen & W. C. Penang	Dull to fine	4½d a 5d
PLUMBAGO, lump cwt.	Fair to fine bright bold	43s a 47s
	Middling to good small	18s a 25s
chips ,,	Dull to fine bright	20s a 27s 6d
dust ,,	Ordinary to fine bright	13s 6d a 22s 6d
SAFFLOWER ,,	Good to fine pinky ...	80s a 85s
	Middling to fair ..	60s a 70s
	Inferior and pickings ...	50s a 55s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£20 a £35
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ..	£4 a £8
SAPANWOOD Bombay ,,	Lean to good ...	£4 a £5
Madras ,,	Good average ...	£4 a £5 nom.
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth ..	£6 a £7
SEEDLAC cwt.	Ord. dusty to gd. soluble	55s a 60s
SENNA, Tinnevelly lb	Good to fine bold green	4½d a 6½d
	Fair middling medium	3d a 3¾d
	Commou dark and small	2d a 2½d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's D's and B's Small ...	£4 a £5 15s
Mussel ,,	Small to bold ...	£1 5s a £3 2/6
TAMARINDS, Calcutta ..	Mid. to fine bl'k not stony	15s a 16s
per cwt. Madras	Stony and inferior ..	10s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	18s a 23s 6d
TURMERIC, Bengal cwt.	Fair ...	18s
Madras ,,	Finger fair to fine bold bright	27s 6d
Do. ,,	Bulbs ..	17s
Cochin ,,	Finger ..	18s
	Bulbs ..	9s 6d
VANILLOES— lb.		
Mauritius and Bourbon 1sts	Gd. crysallized 3½ a 9 in.	20s a 32s
2nds	Foxy & reddish 4½ a 8 ,,	16s a 22s
Seychelles 3rds	Lean and inferior ..	10s a 14s
VERMILION lb.	Fine, pure, bright ...	2s a 2s 1d
WAX, Japan, squares cwt	Good white hard ...	31s 6d a 32s

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for July:—

Vol. XI.] JULY, 1899. [No. 1.

SEASON REPORTS FOR MAY, 1899.

W*ESTERN Province.*—Paddy. Sowing for Yala over. Rainfall heavy. Rinderpest in Rayigam Korale.

Central Province.—Paddy. Yala cultivation in early stages; rainfall sufficient, 6·46 in. registered at Matale. Health of cattle fairly good.

Northern Province.—Paddy. Fields in preparation. Rainfall 2·36 in. at Jaffna, 5·63 in. at Mannar, 3·57 in. at Mullaittivu. Health of cattle good, except in Mullaittivu district, where there is murrain.

Southern Province.—Paddy. Yala crops in early stage promising well. Rainfall 18·35 in. at Galle. No reports of cattle disease.

Eastern Province.—Paddy. Fair prospects, though some damage by caterpillars in Batticaloa district. Rainfall nil at Batticaloa, ·51 in. at Trincomalee.

North-Western Province.—Paddy. Yala crop still young. Prospects generally good. Rainfall fairly distributed, 2·33 in. at Puttalam. Cattle disease still lingers in some districts.

North-Central Province.—Paddy. Yala crops still young. Rainfall 3·94 in. at Anuradhapura. Health of cattle fair.

Province of Uva.—Paddy. Maha harvest nearly over, and preparations going on for Yala. Prospects middling. Weather dry. Health of cattle good.

Province of Sabaragamuwa.—Paddy. Yala cultivation in progress, prospects favourable. Rainfall at Ambanpitiya 10·5 in., at Ruanwella 29·8 in. Cattle murrain in both Ratnapura and Kegalle districts.

THE ANNATTO DYE OF COMMERCE.

Dr. Nicholl's work from which extracts appeared in the May number of the Agricultural Magazine I suppose is a recent publication. It would therefore be interesting to know before entering into discussion, what older authorities had written on the subject. This is what P. L. Simmonds in his great work *Tropical Agriculture*, 1877 edition, p. 388, writes in reference to the annatto industries in Guadaloupe and Cayenne:—"The fruit is like a chestnut, a two-valved capsule covered with flexible bristles and contains a certain number of seeds smaller than peas. These seeds are covered with a soft, viscous, resinous pulp, of a beautiful vermilion colour, and unpleasant smell like red lead mixed with oil, and it is this substance which constitutes annatta, or arnotto. The mode in which it is obtained is by pouring hot water over the pulp and seeds, and leaving them to macerate, and then separating them by pounding with a wooden pestle. The seeds are removed by straining the mass through a sieve; and the pulp being allowed to settle, the water is gently poured off, and the pulp put into shallow vessels, in which it is gradually dried in the shade. After acquiring a proper consistence it is made into cylindrical rolls or balls, and placed in an airy place to dry, after which it is sent to market. It used to be most common in this form as small rolls, each 2 or 3 ozs. in weight, hard, dry and compact; brown without and red within. The other process of manufacture is that pursued in Cayenne. The pulp and seeds together are bruised in wooden vessels, and hotwater poured over

them; they are then left to soak for several days, and afterwards passed through a close sieve to separate the seeds. The matter is then left to fermrent for about a week, when the water is gently poured off, and the solid part left to dry in the shade. When it has acquired the consistence of solid paste, it is formed into cakes of 3 or 4 lbs. weight, which are wrapped in the leaves of the banana, and known in commerce as flag arnotto. This variety is of a bright yellow colour, rather soft to the touch, and of considerable solidity. Labatstat informs us that the Indians .... instead of steeping and fementing the seeds in water, rub them with the hands previously dipped in oil, till the pulp comes off and is reduced to a clear paste which is scraped off from the hands with a knife, and laid on a clean leaf in the shade to dry ...... It owes its value to the colouring matter bixin and orellin, which constitute about 20 per cent of good dry annatto."

The following occurs in A. G. F. Eliot James' *Indian Industries*, 1880, p. 97 :—" The *Bixa Orellana* belongs to the natural order Bixineae. The East Indian Bixa is found chiefly in Mysore, Travancore and Bengal. The capsules or pods are at first of a palish rose colour, but they change when ripe to a deep brown and burst open disclosing their bright-coloured contents. Directly the pods are quite ripe they are gathered, stripped of their husk and well bruised. The pulp surrounding the seeds is the portion of the pod containing the valuable arnatto dye of commerce; it is extracted by bruising and macerating the pod (*sic*) in water, they are left in just enough water to cover them for some days, or until the fluid begins to ferment, it is then thrown off, and the pulp allowed to subside. Sometimes arnatto goes through a beating process, similar to that employed in extracting indigo dye, before it is finally allowed to settle. The pulp which remains is then placed in shallow pans and left to dry in the shade. If it has been thoroughly well prepared it will be of a bright yellow colour, that is the American and West Indian arnatto, the East Indian has a rose-coloured dye prepared from it, so says Colonel Dury in his account of the substance in The Useful Plants of India. . . . . Formerly arnatto was obtained by a much more tedious process than now prevails, which was first introduced by Leblond, and consisted in merely washing the seeds until all their colour was extracted, precipitating the colour with vinegar or lemon-juice, boiling it up to facilitate the removal of impurities with the scum, and then draining it in bags. M. Vanquelin made several experiments on the arnatto pods, and quite confirmed the efficacy of these simple measures, which really enhanced the value of the dye ,and made it even of more decided use to dyers. As arnatto is not easily soluble in water, alkalies are generally employed to hasten its solution, potash being most generally used; they also improve the colour of the dye; it is perfectly soluble in alcohol. (p. 96.) Arnatto before being used by dyers, varnishers and lacquer makers is always boiled with half its weight of American ash, in the least possible quantity of soft water; it is used in dyeing silks, straw, buff, and cream-colour; chamois, salmon-colour, orange, amber, and scarlet with cochineal, &c.; in dyeing cottons, orange and orange yellow; in varnish, for gilt articles and for light wood work; in lacquer, for brass, pigments, such as orange lake, &c. In fact it is one of the most useful yellow dyes and one much in demand. It is to be hoped that the East Indian variety may become better known, and that it may also be made more valuable by being more carefully prepared."

This was written in 1880. In 1885 " The Pure Ceylon Annatto Dye Works " were started by the late Mr. A. G. K. Borron on his extensive property, Crystal Hill estate, whose assistant superintendent the writer—its present proprietor—was. Our main effort was to " more carefully " prepare the dye by adopting either one or the other processes described by these authorities. But our disappointment may be easily imagined when the contradictory accounts of the different writers is considered. These were confusing and put us into great expense by the necessity of experimenting on the different processes, before hitting upon one with success, and that one is this. To make PURE DYE the seed should not be bruised, but carefully washed, after it had been subjected to acetous fermentation which has to be regulated according to the weather. The acid used is sulphuric diluted with a certain percentage of water for the dry seed; but when fresh seed is used, a natural acid—acetic—is generated by the seed itself. If the fermentation is thorough the seed need be washed only in two waters, and the liquid strained and separated. To remove the acid is the next secret; this is done by boiling the liquid after it has been concentrated by applying alum and the superfluous water drained off by pumping it out from the top of the tub or cistern in use. The boiled mass contains the two principal colouring matter, one red and the other yellow. Here is the other secret; if it is dried hard the yellow goes off; but in the consistence of putty both colours are retained. The latter is now known as "Ceylon Paste" and considered to be superior to that produced in any other part of the globe. "Cake annatto" as well as "flag annatto" too were produced in my factory, but the trade does not take them. Here then is the solution for the various contradictory and conflicting statements found in Dr. Nicholl's work as well as in others that I have seen with regard to the shape in which annatto is brought to the market. For, as in everything else, there are different varieties of *Bixa orellana* growing in different countries all known by the name annatto, arnatto, anota, &c. In Ceylon we have two varieties—one with the pink or rose-coloured flower which give the red-coloured pod and scarlet seed; and the other with white flower, green-coloured pod and a deep orange-coloured seed. The red variety I find is the stronger dye, and is more valuable, but requires to be manufactured into paste only; dried hard it becomes worthless. The green variety gives yellow-colouring matter in place of the scarlet substance obtained from the red variety. It is of no consequence whether the yellow is made into paste or cake as it has nothing to lose by deterioration in one form or the other. Now the manufacturers of the dye in the West Indies where the green variety may be growing, adopt a certain process by which the cake is produced, and a writer whilst describing that process, falls into the error of applying the same process

to another country where the red variety may be growing, and only the paste is made and sent to the market. In the foregoing remarks I have not mentioned the method of drying the boiled mass which is done by a centrifugal machine, and also spread on linen and hung over a fire. This machine is the same about to be utilized for manufacturing indiarubber.

A. VAN STARREX.

Matale, 20th June, 1899.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF MAY, 1899.

1	Monday	Nil	17	Wednesday	·22
2	Tuesday	Nil	18	Thursday	1·2
3	Wednesday	Nil	19	Friday	7·65
4	Thursday	Nil	20	Saturday	1·94
5	Friday	Nil	21	Sunday	Nil
6	Saturday	·87	22	Monday	Nil
7	Sunday	1·26	23	Tuesday	·12
8	Monday	·06	24	Wednesday	Nil
9	Tuesday	Nil	25	Thursday	Nil
10	Wednesday	Nil	26	Friday	Nil
11	Thursday	Nil	27	Saturday	·48
12	Friday	Nil	28	Sunday	·3
13	Saturday	2·25	29	Monday	·55
14	Sunday	3·55	30	Tuesday	·23
15	Monday	Nil	31	Wednesday	Nil
16	Tuesday	·56	1	Thursday	Nil
				Total	21·24

Greatest amount of rainfall in any 24 hours on the 19th inst. 7·65 inches.

Mean rainfall for the month ·68 in.

Recorded by Mr. J. A. RODRIGO.

OCCASIONAL NOTES

We should have mentioned in referring to Dr Dodge's book on "The Useful Fibre Plants of the World" that we are indebted to Mr. John Warr of Paterson, New Jersey, for his assistance in enabling us to procure us a copy of the valuable work, for which we tender him our best thanks.

In this issue we give the first part of a paper on the subject of Fibres with which Dr. Dodge prefaces his book. It is a short but comprehensive account dealing with the different aspects of the question, and is full of instruction to the student of Economic Botany.

We are glad to notify that we shall from time to time publish Veterinaiy Notes dealing with cases occurring in actual practice in Colombo, and which for that reason should prove of value to all horse and cattle owners. The contributor of the notes in the present issue is a qualified Veterinary Surgeon, who has started practising in the Metropolis under favourable auspices, and as a past student of the School of Agriculture, we are pleased that he should be once again connected with the institution through the Agricultural Magazine. Mr. Chinniah has set an admirable example to his brethren in his new departure from the beaten tract of veterinary medicine, by making a trial of the preventive treatment for rinderpest, and we heartily congratulate him on the encouraging results of the trial.

We understand that the report of the Commission appointed by H.E. The Governor of Ceylon to consider the advisability of organising a department of Agriculture for the Island is due next month, and its contents are being eagerly looked forward to. It is to be hoped that the Commission will see its way to recommend some practical measures for the improvement of the agriculture of the Island, particularly the native side of agriculture, and that some properly organised controlling body will be appointed to overlook the agricultural interests of the Colony.

The approaching Agri-Horticultural Show to be held in Colombo bids fair to be a great success. The awards which, as a rule come a day after the fair, have been received betimes. They consist of 12 gold medals and 200 silver medals: the former worth £7 10*s.* the latter 15*s.* each. The Hon. Mr. F. R. Ellis, who is just now absent from Ceylon, evinced the greatest interest in the Show, and through his headmen disposed of no less than R3,000 worth of tickets in the villages, so that there should be a large attendance of the peasantry for whom the Show should have special attractions and valuable lessons to teach. The Hon. Mr. G. M. Fowler, who has succeded Mr. Ellis as Government Agent of the Western Province, is no less keen in making the Show a success. It is to be hoped that Government will help the Society in making the Show an annual event.

FIBRES.

[A PAPER BY DR. CHAS. RICHARDS DODGE.]

Definition of Fibres.

The tissue of plants when viewed under the microscope is seen to be made up of cells which are compacted together as they are formed during the growth of the plant, thus slowly building up roots, stems, and leaves. The walls of these cells inclose the life germ, or protoplasm, and the substance of which they are composed is known as cellulose, which chemically is very similar to starch.

Regarding the size of the cells of which common plants are made up, Dr. Gray states that their ordinary diameter in vegetable tissue is between one three-hundredth and one five-hundredth of an inch. The smaller of these sizes would allow as many as 125,000,000 cells in the compass of a cubic inch. "All soft cellular tissue, as leaves, pith, and green bark, is called parenchyma, while fibres and woody parts are composed of prosenchyma, that is, of peculiarly formed strengthening cells." We are also told that those cells that lengthen and at the same time thicken their walls form the proper woody fibre or wood cells; those of larger size and thinner walls, which are thickened only in certain parts so as to have peculiar markings, and which often are seen to be made up of a row of cylindrical cells, with the partitions between absorbed or broken away, are called ducts, or

sometimes vessels. There are all gradations between wood cells and ducts, and between both these and common cells. But in most plants the three kinds are fairly distinct. Wood cells or woody fibres consist of tubes, commonly between one and two thousandths of an inch in diameter. When highly-magnified one can see how button-wood, for instance, illustrates the manner wood cells are put together, their ends pointed and overlapping, thus strengthening the whole.

Wood cells also occur in the bark, though they are longer, finer, and tougher than those found in the wood. They form the principal part of fibrous bark, or the bast layer, and are called *bast*-cells. These give toughness and flexibility to the structure, and the extracted bundles of these cells form the filamentous product known economically as fibre, such as flax, hemp and jute derived from Dicotyledonous plants. " In monocotyledons the fibrous cells are found built up with vessels into a composite structure known as fibro-vascular bundle."—(Dr. MORRIS.) Such fibre occurs in the palms, and in the fleshy-leaved Agaves, like the century plant, the fibro-vascular bundles being found not in the outside covering of the trunk, as in bark, but throughout the stem, or leaf, forming what may be termed (in an Agave leaf, for example) the supporting structure, or that which gives rigidity and toughness to the leaf. These filaments or bundles of elongated, thickened cells, pressed firmly together, when extracted or separated from the soft cell mass by which they are surrounded, may be known as *structural* fibre, of which the fibre of sisal hemp is an example. The simple cells already described, when single or agglutinated and produced on the surface of the leaves, stems, and seeds of plants as hairs, form a fibrous material also valuable, to which the name *surface* fibre has been given. Such hairs are found enveloping the seeds of plants, and when they are produced in the boils or capsules of species of Gossypium form the cotton of commerce.

The fibre bundles, therefore, whether occurring as bast fibre or structural fibre, or whether in the form of simple cells, as surface fibre, may be regarded as the spinning units, and a flax thread is but an aggregation of bundles of bast cells purified and cleansed of all extraneous matter and simply twisted together. In the perfecting of processes therefore for separating, cleansing, and purifying the bundles of cell structure known as fibre, a knowledge of their physical structure is absolutely essential. The rotting of a fibre is simply the breaking down of the cellular structure or complete separation of the individual cells, by which means the filament is resolved into its smallest parts, each part being measured by the length to which the original cell attains during the period of its growth.

(To be continued.)

RINDERPEST INOCULATION.

"Alston Lodge," Cinnamon Gardens,
Colombo, June 15.

DEAR SIR,—I herewith send you a report on the recent outbreak of rinderpest at Hatton, which afforded me an opportunity of trying Professor Koch's and Dr. Edington's methods of preventive inoculation. As you will see from the report and Mr. Paterson's letter, the results have been very encouraging.

Being only a private practitioner who has but lately started practice, I have not yet fully equipped myself with all the necessary apparatus for inoculation, and I was much disappointed to find that I could not obtain such apparatus in Ceylon, while even the Government Veterinary Department was unable to supply me with a veterinary hypodermic syringe in working order. I intend carrying on inoculation, if the opportunity offers, and I am glad to say that another estate proprietor in Dikoya is willing to have his whole herd operated on.—I remain, dear sir, yours faithfully.

A. CHINNIAH.

I received an urgent call from Messrs. Aitken, Spence & Co., Hatton, on the 4th of May last, and on my arrival there I was told that within one week three of the best bullocks, out of a batch recently purchased in Colombo, had died within a day, after serve purging. There was another bullock which shewed similiar symptoms, and to see which I was specially summoned. When I saw the animal he was only off feed, with no fever, and a stimulant mixture brought him round in a few days. When I was asked my opinion, I told the Manager that unless I held a *post mortem* examination I should not be able to say anything, for the symptoms might have been either those of poisoning or rinderpest. I advised him, however, to adopt the ordinary precautions against the spread of contagious diseases which he was very willing to do.

On the 7th May I received another telegraphic message intimating that three more animals had taken ill and that two of them were in a very bad way. I proceeded thither on the 8th of May and held a *post mortem* examination on two animals. With the bile obtained from them I inoculated four bullocks with 10 cc. of fresh bile. Of the four inoculated, one caught the contagion and died. This animal was a high-conditioned lazy beast, and I believe it was owing to this fact that he succumbed so readily (very possibly infected previous to the inoculation).

I may mention that one inoculated animal was intentionally exposed to contagion, but did not contract the disease.

I assured the Manager that inoculation was all that we could do, but I was unable to inoculate the whole herd at one time, owing to the fact that the working of the animals could not have been suspended. Under the circumstances I was able to inoculate only a few head of cattle at a time. Those that were not inoculated, readily caught the contagion and most of them died; while out of twenty-seven that had been inoculated by me only two contracted the disease, one of which died under the circumstances I have detailed above.

The following is a detailed account of my inoculation:—

9th May.—Inoculated four bullocks with 10 cc. of fresh bile.

16th May.—Inoculated two, one with 10 cc. the other 18 cc. of glycerinated bile.

18th May.—Four animals with 15, 18, 20, 20 cc. respectively.
19th May.—Two animals with 20 cc. each.
21st May.—Two animals with 12 cc. and 14 cc.
30th May.—One animal with 18 cc.
2nd June.—Twelve animals, one with $12\frac{1}{2}$ cc., and the rest with 10 cc. each.

The following is the letter referred to:—

Hatton, June 13.

Dr. A. Chinniah, Veterinary Surgeon, Colombo.

Dear Sir,—In reply to yours of 10th, none of the bulls you inoculated when last here have taken the disaese. Two previously inoculated took ill, one died, the other has recovered.

I cannot but think it was a pity so much time was wasted between your first pronouncement of the disease being rinderpest and the inoculation of all the stock.

The animals which recovered will be branded with an I as requested.

(Signed) W. B. PATERSON.

INSTRUCTION IN AGRICULTURE.

The following is a clause of a bill that has been introduced into the Outario Legislature:—

The Council of every Municipality may, subject to the regulations of the Education Department, employ one or more persons holding the degrees of the Bachelor of Science of Agriculture or a certificate of qualification from the Ontario Agricultural College, to give instruction in agriculture in the separate public and high schools of the Municipality, and the Council shall have power to raise such sums of money as may be necessary to pay the salaries of such instructors, and all other expenses connected therewith. Such course of instruction shall include a knowledge of the chemistry of the soil, plant life, drainage, cultivation of fruit, the beautifying of the farm, and generally all matters which would tend to enhance the value of the product, of the farm, the dairy, and the garden.

Commenting upon which an Indian contemporary makes the following forcible remarks:—

The lines upon which the Ontario authorities are proceeding are deserving of careful consideration in this country. Agricultual education is rapidly coming to the forefront as one of the necessities of the times. Indeed, most thinking men now recognise that next to a thorough grounding in the three R's, young people attending State schools are most in need of a course of agricultural instruction sufficiently comprehensive to enable them in after life to carry on the business of farming in an intelligent and successful manner. But, instead of special attention being given to teaching of this kind, it has long been a source of complaint in this country, as well as in many other parts of the world, that the system of education provided for the young is calculated to engender a distate for life on the farm. Boys spend a great deal of valuable time in learning things that are of no earthly use to them in after-life, while a grounding in the principles of agriculture is neglected, either because the teachers have no knowledge of the subject, or are disinclined from their point of view to waste time in teaching something that is not included in the list of subjects on which the pupils are examined by the inspectors. As the teachers gain nothing by imparting agricultural instruction, even if they possess the ability to do so, it is hardly to be wondered at that the subject practically receives no attention. Agricultural teaching, including matters relating to dairying, should constitute an important part of the education of State school children. Only a few of the large number who must depend for a living on farm work can take a course at the one agricultural college in the colony which has been succesfully conducted. To make agricultural education general, the public schools must be utilised.

It is absolutely certain that if those engaged in rural industries are to hold their own in competition against the rest of the world, their education cannot begin at too early a period in their lives. Hitherto there has been a much too general desire on the part of young people whose parents can afford to give them a fair education to become members of the learned professions. The result of this is overcrowding, and the impossibility of the majority making a living, nothwithstanding the time, money, and hard work spent in acquiring the right to use certain capital letters after their names. The case of boys who qualify themselves to pass the Matriculation examination and afterwards become clerks, etc. is worse, and as each batch comes forward, competition is keener, and it is more and more difficult to make a decent living. There has been far too much of this sort of thing and our system of education is in some measure responsible for it. Enormous sums of money are annually spent in educating our youth, and no effort worthy of the name is made to direct their attention towards the industries that afford them the best prospect of making a living, and the development of which is of the greatest value to the State. In almost every country in Europe elementary practical instruction in agriculture is given in primary schools, through the medium of travelling instructors, or professors who not only superintend the agricultural course in the schools, but also hold conferences, give lectures and advice, and keep themselves closely in touch with the actual cultivators of the soil. That some such system will have to be adopted in India if progress is to be maintained goes almost without saying. The farmers, horticulturists, or dairymen of the future must possess a thorough knowledge of their calling, and to insure this the teaching must begin in early youth.

VETERINARY NOTES.

I. THE USE OF A CANDLE LIGHT IN OPERATING FOR WORM IN THE EYE.

Filaria occuli does not commonly affect horses in temperate climes, and, indeed, it might be said to constitute a tropical disease. In India it is found to occur more frequently on the eastern coast and less so on the western side. Filaria may be said to be pretty common in Ceylon.

The parasite gains entry into the system of the horse through the medium of water, and when it enters the circulation it does not begin to develope till it finds itself in the aqueous humour of the eye. Other instances of parasites

reaching special organs before developement are the fluke affecting the liver of the sheep, and the parasite occurring in the brain of the same animal and causing the disease known as sheep staggers, sturdy or gid. The tendency of filaria to reach the aqueous humour is attributed to its fondness for the light, and if it is not removed in time the irritation caused by its movements in the eye causes *total* blindness in the subject.

As a preventive against filaria, it is advisable that grass should be allowed to wilt or wither before being given to the animals, while care should be taken that only fresh pure water is used for drink, all sources of stagnant water being avoided.

On April 27th last I was summoned to operate on a mare belonging to Mr. Jacob de Mel for the removal of filaria occuli. As the parasite had been visible on the previous evening, I recommended that the operation should be put off for the following morning, as it is a habit of the worm to retreat from the light after exposing itself to its influence for a period, only to reappear again after a short interval; again recent movements have a tendency to cause a cloudiness which makes the detection of the parasite a matter of some difficulty.

On the day fixed for the operation I proceeded to cast and secure the mare, and after getting her head in an elevated position, I induced local anaesthesia by bathing the eye with a solution of cocaine. I, however, found it difficult to bring the parasite and keep it steady at the proposed seat of puncture (the upper and outer margin of the cornea). It occurred to me at this stage that the fact of the parasite affecting the light might be taken advantage of by placing and artificial light opposite the seat of operation, and the worm so attracted to and kept steady at the required point. To this end I ordered a lighted candle, by the use of which I was able to attain my object, viz., the removal of the worm with ease and certainty.

II. PROTRACTED LABOUR OF 12 HOURS IN A MARE.

On May 28th last I received a call to attend on a chestnut Delft pony mare at Messrs. Walles' yard in Colpetty. This mare had been brought over from Delft and landed by the Government Veterinary Surgeon, as far as I could ascertain, on the 9th of April. The pony which had been sold to, and is now in the possession of an officer of the H.L.I. Regiment did not show any symptoms of ill-health till May 27th, when labour pains began at about 10 p.m., and soon after the attendant in charge noticed the bursting of the water-bag. All through the night of the 27th the animal was in labour and continued to strain with no result. On my arrival the next morning (about 10 a.m.) I found that the animal in poor condition and unable to help the natural process of foaling by any effort on her part. I proceeded to administer a dose of ergot and sulphuric ether, and on examination found the knees of the foetus bent and the head and neck only protruding. Pushing back the head, I succeeded with some difficulty in securing both the forelegs one after the other, and with a steady pull managed to get the position of a normal presentation and delivered the foetus (which was larger than was to be expected) in a dead condition. As the foetus was fully formed I considered this a case of premature birth and not of abortion. In the light of my knowledge of the history of the mare I would ascribe the cause of her premature labour to the effects of her recent sea-voyage, while protraction of labour is attributable to her low condition and consequent weak state of health.

The temperature of the mare, after delivery of the foetus, was 105° F., and the pulse frequent and small. I prescribed the following:—

Sod. hyposulph. ...	6 drs.
Mag. sulph.	10 oz.
Aq. camph.	1 pt.

¼ part every 8 hours.

Later, on the temperature rising to 106° F., and the animal becoming very dull and refusing all nourishment, I gave

Tinc. aconit.	½ dr.
Tinc. digit.	20 m.m.
Water	1 pt.

⅓ part every 4 hours.

On the 30th the fever was reduced to 102° F., and the following mixture was prescribed:—

Quin. sulp.	2 drs.
Acid. sulph.	1½ drs.
Spt. Aeth. Nit.... ...	2 oz.
Aq. menth. Ppt. ...	1 pt.

¼ part every 4 hours.

The womb was washed twice a day with Condy's fluid, and the mare is now quite recovered.

D. A. CHINNIAH, *Veterinary Surgeon.*

SISAL HEMP.

The question of cultivating this plant which has proved a source of large profits to growers in the Bahamas and other parts (and in which our Secretary for the Colonies is said to be financially interested), has never been seriously thought of in Ceylon. Quite lately a good deal of interest was evinced in the Mauritius hemp traceable no doubt to the fact that a "new patent" was being "boomed" through local speculators. What has been the outcome of the mild excitement over Mauritius hemp as the *deus ex machina* which was to come to the rescue of the planter when low prices and other unavoidable circumstances placed him in jeopardy, we have never been able to find out. But one thing is certain, and that is that we are not likely to hear of further trials with new patent machines for treating Mauritius hemp in Ceylon.

We read in the *Indian Agriculturist* of no less an authority than Mr. Marshall Woodrow of the Indian Botanical Department pledging his faith in sisal hemp as an Indian fibre crop, and for the benefit of our readers who may see a possibility of growing sisal in Ceylon under similar conditions to those obtaining in India, we reproduce the remarks referred to above:—

Mr. Marshall Woodrow is so fully persuadee that sisal hemp is a good thing that he is determined to sacrifice Government service for it, and to start a limited liability company to grow and manufacture it. Mr. Woodrow, it will be remembered, introduced a few sisal hemp plants into the country seven years ago, and they grew remarkably well, giving 10,000 young plants. The fibre from the original plants proved of high

quality, and is valued £23 to £30 per ton in London. The cost of producing and exporting the fibre is estimated at R225 per ton, and if sold at £20 per ton, the profit would be 33⅓ per cent on the capital. Five years are required to produce the first crop of 3,000 lbs. of fibre per acre; thereafter 1,000 lbs. per acre yearly may be obtained. As the sisal plants increase in number in a rising ratio, it is calculated a very short time will be sufficient to obtain commercial quantities. Its principal use heretofore has been in the manufacture of ropes and carpets, but it is said that wider use for it have now been found. A sample of this fibre sent by Mr. Woodrow was tested by an expert. His report shows the sample to have plenty of tensile strength, but when put to a breaking strain, breaks "short," which is consistent with the general appearance and harshness of the fibre. If some means could be adopted to put the fibre through a process which would soften it, and at the same time not diminish its virtue, it would stand even a greater tensile strain, and also give a break more after the style of true hemp. He tested two specially made strands, and says the smaller one, which is below the Admiralty standard in size, stood the Admiralty test of 112 lbs., and broke at 120 lbs. This is very satisfactory except for the shortness of the break mentioned above. The second sample strand, which was made up to the Admiralty requirements, stood the same test (112 lbs.) and broke at a deadweight of 140 lbs., showing that nothing has to be feared as regards tensile strain. The expert, whose report we quote, says he is of opinion that this fibre when softened and worked into the larger kind of hawsers would meet with success, providing, of course, that the price is equal to or below that of hemp or coir. But for the smaller kinds of rope, unless the "shortness" of the break can be obviated, the fibre would not stand so well, more especially when taking short turns, around bitts or bollards. Its success depends on the cost of production, and if rope made from this fibre can be put on the market at a less price than hemp or coir, the chances are that there will be a great demand for it, in spite of enormous quantities of wire rope of all descriptions which is used at the present time.

PANICUM COLONUM.

Mr. H. Jardine, manager of an Experimental Farm in Queensland, refers as follows to the above grass (indigenous to Ceylon) which is apparently unknown to stock owners:—

We often import at great expense and trouble foreign grasses and plants. This is right enough in its way. But I am inclined to think that often better results would be obtained by cultivating and improving some of our indigenous gasses which for æons past have adapted themselves to our soils, climate, and circumstances. When visiting farms in this newly-settled district (Biggenden and the surrounding neighbourhood), I was struck by the luxuriant appearance of a grass which was quite new to me. It is leafy and succulent, stooling well, growing very thick, and reaching 3 to 5 feet in height. It is mostly found on rich land, such as, for instance, old sheepyards and camping places, and in one instance at least I saw it healthy and thriving well at the bottom of a hill where there was a soakage, rendering life impossible for corn and other plants, which were there stunted, yellow, and dying out A local dairyman of great experience (Mr. Fowler) told me he considered the grass unsurpassed as a cow fodder.

As nobody in the district could tell me either the vernacular or the botanic name of the plant, I sent a handful of it to the Government Botanist (Mr. Bailey) who writes thus about it:—"The grass of which you forward a sample is *Panicum colonum* (Linn). It is indigenous in Queensland and most tropical and sub-tropical parts. In India it is considered one of the best for fodder, all kinds of stock being fond of it, and the abundant quantity of grains which it produces is considered to add greatly to its nutritive qualities."

Mr. Bailey adds that it is not so widely spread as a close ally, the *P. crus-galli*, but is probably better, and would be more easy to manage in cultivation, requiring, however, a good and *probably damp soil.*

From what I have seen so far of the grass, it seems to me to be a summer fodder, coming into seed in February and March. When depastured or mown down, it grows again very rapidly. I think it would stand a great amount of moisture being thus well adapted for dairymen to grow on the coast during the wet season.

At Mr. Bailey's request, I am now gathering some seeds of it for distribution to those desirous of giving it a trial on a small scale. One should be careful, though, to keep it well under control. Like all good fodder grasses, it is likely to become a nuisance amongst other crops. It does not extend by means of rhizome roots, like couch or Johnson grass; but its tiny seeds are very numerous and shed easily, so that it becomes difficult to eradicate it once it has got established.

AN INTERESTING LETTER ABOUT RHEA.

(To the Editor "Indian Agriculturist.")

SIR,—As you gave us a notice of our ramie experimental installation at Staines, you will perhaps not be indisposed to give your readers the news of our experiments having proved most successful. When we started, we were confronted with the following difficulties:—1st, supply; 2nd, decortication; 3rd, preparation; 4th, spinning; and lastly, demand or market. I will deal with these *seriatim* later. Ungumming, which had hitherto proved such a fruitful source of difficulty, had long been overcome by us; the gum question presented no terrors nor difficulties; by our method ungumming is simple and the durability of the fibre is unsurpassed, as is proved by the yarns which have been in use now three years. They are as strong now as when first prepared. I refer to those made at Staines. I have products prepared by our process which have been in use ten years and are as good now as ever. I will deal with the obstacles as they appeared at the initiation of our works at Staines.

Supply.—There is a vast supply in China, where the natives have cultivated it and all the best textiles are made from it. The wealthy Chinese

hold it in high esteem and it fetches high prices. Very small quantities compared with the vast crops grown, unfortunately, have yet found their way out of China. We have based our calculations on the price of raw material at £30 per ton, and at this price I can show a paying industry competing with flax, but I am promised contracts as low as £20 per ton; this will open up a vast field and enable us to compete with cotton. India produces vast quantities in a wild state; these will have to be brought under cultivation. Dr. Morris, of Kew, recommends ramie to the planters who cannot make sugar pay. It would be a boon to our West India Colonies. The Australian Colonies are growing ramie; Queensland and New South Wales have sent us splendid quality. The United States Government are recommending it to their farmers, and the Government has voted $145,000 to the establishment of experimental plantations. Mexico, it appears from a Consular report, shows 145 per cent profit in ramie-growing. From South America I have splendid samples; as many as four crops in the year are cut, and I am promised regular supplies at a price which will put ramie on the market as a competitor to cotton. There is a vast field in Egypt and Soudan. The Government of Natal is recommending ramie-growing. Plantations are already started in Borneo, Ceylon, Straits Settlements, Formosa, Java, and the Malay Peninsula; Corea produces splendid ramie, and the Japanese are turning their attention to ramie-growing. In short, I hear from all quarters of the globe of the great advance in ramie-growing, and I have not the slightest doubt it will prove a strong rival to cotton. To our Colonies I would suggest ramie-growing, and, by the use of our decorticators, ribbons could be prepared whilst in a green state, for the ungumming process and filasse should be prepared on the plantation. It is a simple operation and the plant would not be expensive. The filasse so produced would be far superior to that produced from the dried ribbons, and in addition there would be a great saving in freight. The waste products, *viz.*, the leaves and lateral shoots, would produce an invaluable pulp for high-class paper making and command a high price.

Decortication.—In China this is accomplished by hand labour. The operator strips the ribbons from the stem and scrapes the fibre, removing the pelicule or brown bark and much of the pectose gummy matter whilst in a green state. The natives of India merely strip the plants and make no attempt to clean them. These rhea ribbons command a much lower price than the Chinese cleaned strips. Our decorticator cleans the ribbons similarly, but leaves them in a more perfect condition than those produced by Chinese hand labour, removing considerably more of the pectose in its fluid state.

Preparation.—The next difficulty is dressing the fibre ready for the spinner. Hitherto the expensive process of preparing on silk dressing machinery has stood in the way, and when we can turn out an article absolutely without waste beyond the shorts or noils which exist in the fibre, at a cost of one-halfpenny, which hitherto has cost 9*d.*, we can claim success and considerable advance.

Spinning.—This is now a simple process. Our wet spinning frames produce an even yarn, gasing is no longer necessary, and the strength and lustre of the fibre is materially advanced by its abolishment.

Market.—On account of its great strength and lustre it is especially in demand for lace, duck, khaki, sail cloth, fishing-lines, braiding, tapestry, and all purposes where special strength or lustre is of advantage. It mixes with and fortifies weak wools. And as the price of the raw material is lessened, so in proportion will the demand increase. Our latest is milo-thread.

We shall be pleased to send you samples. For yacht-sails it has achieved a great success. The *Defender's* sails were ramie. The *Cona*, one of the most successful English yachts, carried ramie sails made by our process. As the fibre does not rot in water it is particularly applicable to fishing nets, sails, and rigging, and its great strength commends it further for these purposes.

D. EDWARDS-RADCLYFFE,
Hythe End Mill, Staines, Middlesex.

THE WHIP TREE.

This is the common local name of the tree botanically known as Casuarina equisetifolia—one of the Coniferæ or cone-bearing trees, so uncommon in the tropics, except in the higher elevations. In the Flora of Ceylon the wood is described as "very hard, fibrous, strong and brownish-red."

Mr. J. W. Fawcett, member of the English Arboricultural Society, in his description of the Timber Trees of Queensland, tells us that the generic name, Casuarina, was given by Linnæus on account of the pendent branchlets, resembling the feathers of the bird known as the cassowary All the Casuarinas, he says, are splendid trees for planting. They are very rapid growers, and make good breakwinds, copses or shelter plantations, and the saplings are always useful for many other purposes besides the speedy supply of excellent fuel which they give. Mr. Fawcett thus makes special reference to the whip tree in his descriptive list:—

Botanical Description.—The Horsetail oak is a lofty tree of moderataly large size, attaining a height of from 50 to as much as, 50 feet, with a diameter varying from 12 to 30 in.

Bark.—The bark is rough.

Branches.—The branches, which give it a very peculiar appearance, are long, slender, and wiry; the principal ones are spreading or ascending, the smaller ones generally pendulous or drooping. They are of a greyish-green colour, glabrous or tomentose when young, with very small scale-like sheaths instead of leaves.

Leaves.—The leaves are sheath-teeth, arranged in whorls, from 6 to 8, usually 7 in number, and are very short and acute.

Flowers.—The flowers are diœcious—that is they have neither calyx nor corolla, the stamens with the pistils being on separate flowers. The male flowers have only one stamen, and are in spikes about three-quarters of an inch in length, and terminate in a slender deciduous branchlet. The female flowers possess a one-celled ovary, and are arranged in dense heads.

Fruit.—The fruit consists of hardened bracts collected in a strobilus, or compact cone, about half-an-inch in diameter, of a globular shape, each enclosing a small shining or velvety winged nut.

VERNACULAR AND BOTANICAL NAMES.—The Horsetail Oak (so-called from the likeness of its long pendulous branchlets to the long hairs of a

horse's tail) is also called Forest Oak (from growing in small patches or forests); Coast Oak (from its growing generally on the coast); Swamp Oak (from its growing in swampy localities); Bull Oak (from its robust growth); and Ironwood (from the hardness of its timber). It is called Aitoa or Toa in the Society Islands, Filao in Madagascar, and Noko-noko in the Fiji Islands. The specific name, *equisetifolia*, was given to this species by the Forster brothers, writers on Australian botany, from the resemblance of the branches to an *Equisetum* or Horsetail.

DISTRIBUTION.—The Horsetail Oak loves a maritime situation, growing freely in sandy saline soils. It is found growing in great abundance near salt-water marshes and inlets on the coasts of tropical Queensland, North Australia, New Guinea, the Malayan Archipelago, the Indian Archipelago, on the eastern side of the Bay of Bengal as far north as Aracan, Eastern Africa, Madagascar, the South Sea Islands (Fiji, Society Islands, &c.), &c.

USES.—The Horsetail Oak produces a dark-coloured timber, coarse but closely grained, beautifully marked, hard, light, and tough. It is useful for shingles, staves, and for all purposes where lightness and toughness are required. Its timber makes splendid fuel, giving great heat and leaving very few ashes.

In the Society Islands, where it grows chiefly on the sides of the hills, its timber was formerly used for making clubs and other implements of war. Its hardness and durability led the earlier voyagers to the South Seas to distinguish it as Ironwood, although it is a very different tree from that bearing the same name in North America. This latter is botanically known as *Carpinus americana*, Mich.)* Its dark hairlike pensile foliage gives it a mournful appearance, and in many of the islands of the Pacific it is consecrated to the dead, and, with crimson *Dracænas* and other shrubs and trees, is planted in or near burial-grounds. This tree has long been cultivated in gardens and nurseries, and has been introduced into France and India and other countries. It bears transplanting well, and will grow in sandy soil even to the edge of the sea. Captain Campbell Walker estimates the yield of firewood from this tree to be four times as great as the return from any tree of the forests of France. In India, where it grows on pure sand, it is greatly valued, as its timber bears a great strain, and is not readily injured by submersion in water, and it is also much used as fuel for railway locomotives. The cost of rearing *Casuarinas* in India has averaged, according to localities, from £4 to £10 per acre, and the return, after only eight years, averaged from £13 to £32. I would recommend this tree as a valuable one to plant on the coastal portions of our barren "wallum" patches.

The branchlets of this, as of other *Casuarinas*, have a sub-acid flavour, and are readily eaten and relished by cattle, especially during the droughty seasons in Queensland, and in many parts it is pollarded for fodder.

A variety of *Casuarina equisetifolia*, Forst., named *incana*, having horny or woolly young shoots and large cones nearly an inch in diameter, is found on the islands off the Queensland coast and also in New South Wales.

* The Ironwood of Ceylon is *Mesua ferrea*.

GENERAL ITEMS.

The *Queensland Agricultural Journal* in a paper on Pineapples makes the following reference to the manuring of pineapples as carried in in Fort Myers, Florida:—

A field was manured with a mixture of—
1,000 lb. cotton-seed meal,
500 „ kainit,
500 „ superphosphate
500 „ equal parts of bone-meal and dried blood,
2,000 „ cow manure,
of which 2,000 lb. were applied to the acre.

This mixture corresponds to a fertiliser containing 108 lb. nitrogen, 177 lb. phosphoric acid, and 78 lb. potash, the quantities of these ingredients applied to the acre being therefore as follows:—48 lb. nitrogen, 80 lb. phosphoric acid, and 35 lb. potash.

The field was planted at the beginning of June, 1892, after having been fertilised with 2 tons per acre of the mixture given above. Later the plants received a top-dressing of hen-manure; no record was kept of the quantities of this material applied.

The quality of the soil was light and sandy, corresponding to the typical Florida soil, which is considered of little value. The soil in question contained pretty large quantities of humus and sand at the surface, and had a hard-pan bottom at depth of from 1 to 2 feet. As far as the physical properties of the soil were concerned, it was well suited for pineapple culture. In June, 1893, 5,000 pineapples worth 5 cents (£10 18s. 4d.) a piece were harvested, and in June, 1894, the yield increased to 11,724 per acre, worth 10 cents a piece at the Fort Myers market (£97 14s.). The yield is allowed in the report to have been a complete success.

With reference to the discussion that has been going on among Indian planters on the subject of male coffee plants, Mr. F. M. Baily, the Botanist, says that no such thing as a male coffee plant has ever come under his notice, nor had it, to his knowledge, been mentioned by any other botanist. The coffee plant is neither *diœcious* nor *monœcious*; but is *hermaphrodite*, the flowers containing both male and female organs. As to a tree which bears peaberry being considered a male, the idea is absurd. If the tree were male it would not bear at all any more than a male date tree. It is possible for the flower to have the female organs and for the tree thus to be barren; but still this could not be considered a male tree unless such a condition were ever afterwards its characteristic.

A new industry is being opened up, says an Exchanger to bring hardwood timber into prominence and value. It has been found that the wood of such trees as the beech, birch, maple, when cut into thin veneers and connected together three-ply, the thickness of the whole about $\frac{5}{16}$ inch, make very superior packing cases for carrying all kinds of heavy and light merchandise. To show that this is a very large field, it is stated that about 40 per cent. of the pine now cut finds its way into packing cases. This veneer box is waterproof for all practical purposes, it is less bulky, more durable, and much lighter than the 1-inch pine packing case now in use. By this reduction of weight, the saving in freight and express charges over long

distances, it is claimed, will give the shipper his packing case free of cost, which is a consideration in the expense account not to be overlooked. A veneer factory solely for this purpose, worked by an English company, has already made its appearance in Toronto. Another mill, by a different English company, is being built in the easterly section of New Brunswick, where hardwoods abound close to the seaboard, from where shipments to England, the great user of packing cases, can be economically made by water the year round. Here the veneer is manufactured, cut into sizes, and shipped to the London factory, where the cases are put together and distributed.

It is not generally known that the expressed juice of the garlic makes an excellent cement for broken glass and China. The juice must be applied as soon after breakage as possible, as the edges of the broken parts become worn away by friction. This makes an everlasting cement, and if the edges are joined no sign of fracture remains. The expressed juice of an onion also makes a very good adhesive fluid.

The sweetest oranges generally have rusty looking coats. An English expert says:—Pick out the dingiest in the box and you will get the best." Another test is weight. The heaviest oranges have the thinnest rinds. Thick-skinned fruit are apt to dry inside. The Glen Retreat oranges of Queensland are very fair-skinned heavy fruit and are amongst the best, if not the best of the mandarins.

Two Government Veterinary Surgeons in Cape Colony recommend Cooper's dip (a well-known patent preparation) as the best remedy for ticks. One pound of the dip mixed with 20¼ gallons of water and afterwards with 4 lbs. of soft soap should be used to wash the animals. Owing to the deposit of sulphur among the hair, fresh ticks are found unable to gain a lodgement for some period after the animal has been freed of the pest.

A writer to the *Queensland Agricultural Journal* highly recommends a simple remedy for stings from bees, warps, ants and stinging plants. It is called the "wet-earth" cure and consists of nothing more than applying moistened earth or mud to the affected parts.

Orange trees are very long-lived. In the orangery at Versailles is a tree, raised from seed, planted in 1421. There is another in the convent of St. Sabina, in Rome, said to have been planted by St. Dominic in 1200. In the neighbourhood of Finale is a tree which bears nearly 8000 oranges in a single year. In Holland are many trees which have been in the same family for from 200 to 300 years.